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AUTHOR Carnevale, Anthony P.; Gainer, Leila J.
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ABSTRACT

This publication summarizes research that shows that it would be a serious economic error to favor investment in machines, financial capital, and extracted resources over investments in the education and training of people. The discussion begins by explaining the relationship between job-related learning, individual opportunity, and the competitiveness of employer institutions. Next, it examines the dynamics that link changing skill requirements on the job to training and education. This is followed by a snapshot of the existing and emerging institutions that provide job-related training or access to it. The next section is a closer look at the employer-based training and development system, in general, and the differences between small and large employers, in particular. The following and most sizeable section considers job-related education and training in individual occupations. The discussion concludes with recommendations for improving the nation's job-related education and training system. (YLB)

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the LEARNING ENTERPRISE

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The American Society for Training & Development

U.S. Department of Labor
Employment & Training Administration

the LEARNING ENTERPRISE

by
Anthony P. Carnevale
Leila J. Gainer

The American Society for
Training & Development
Donna McNamara, President
Curtis Plott, Exec. Vice President

U.S. Department of Labor
Employment & Training Administration
Elizabeth H. Dole, Secretary
Roberts T. Jones, Asst. Secretary

CONTENTS

Page

LIST OF TABLES I

PREFACE II

INTRODUCTION 1

PART I SKILLS, INDIVIDUAL OPPORTUNITY, AND COMPETITIVENESS 2
- Skills and Opportunity 2
- Skills and Competitiveness 3
  - —The competitive cycle 4
  - —The American context 5

PART II A MAP OF "THE LEARNING ENTERPRISE" 6
- Changing Skill Requirements 6
- Translating Requirements Into Education and Training 8
- The Institutional Landscape 9
  - —Elementary and secondary schools 9
  - —Colleges and universities 10
  - —Postsecondary occupational education 11
  - —Formal apprenticeship programs 13
  - —Second chance training 13
  - —The career support system 14
  - —The training industry 15
  - —Employer-based training and development 15
- Employer-Based Training and Development: A Closer Look 16
  - —Small versus large employers 18

PART III THE TRAINEES: AN OCCUPATIONAL PERSPECTIVE 23
- Managerial Personnel 23
  - —Executives 23
  - —Managers 25
  - —Supervisors 28
- Management Support Specialists 30
- Nontechnical Professionals 30
- Clerical Personnel 32
- Sales Personnel 35
- Customer Service Personnel 37
- Service Employees 38
- Technical Workers 39
  - —Technical professionals 41
  - —Technicians 42
  - —Blue-collar technical employees 43
- Data Processing Personnel 45

PART IV CONCLUSIONS AND RECOMMENDATIONS 48
- Employers 48
- Educators 49
- Government 50

FOOTNOTES 53

LIST OF TABLES

Page

TABLE 1: Formal Training by Sex and Race of Trainee . . . 17
TABLE 2: Formal Training by Age of Trainee . . . 18
TABLE 3: Formal Training by Source . . . 19
TABLE 4: Formal Employer-Based Training by Industry, 1984 . . . 20
TABLE 5: Demographic Characteristics of Employees by Size of Employer (% of Employees) . . . 21
TABLE 6: Employment by Size of Employer (% of Employees) . . . 21
TABLE 7: Average Number of Hours Spent in Training Activities in the First Three Months on the Job, by Size of Employer (% of Hours) . . . 22
TABLE 8: Sources of Job-Specific Training by Size of Employer (% of Employees) . . . 22
TABLE 9: Sources of Qualifying and Upgrading Training: All Employees . . . 24
TABLE 10: Sources of Qualifying and Upgrading Training: Managers . . . 27
TABLE 11: Sources of Qualifying and Upgrading Training: Supervisors . . . 29
TABLE 12: Sources of Qualifying and Upgrading Training: Management Support Specialists . . . 29
TABLE 13: Sources of Qualifying and Upgrading Training: Nontechnical Professionals . . . 33
TABLE 14: Sources of Qualifying and Upgrading Training: Sales Personnel . . . 33
TABLE 15: Sources of Qualifying and Upgrading Training: Service Employees . . . 36
TABLE 16: Percentage of Women, Blacks, and Hispanics in Technical Occupations, 1986 . . . 36
TABLE 17: Median Weekly Earnings by Sex, 1986 (Dollars) . . . 40
TABLE 18: Sources of Qualifying and Upgrading Training: Technical Professionals . . . 40
TABLE 19: Sources of Qualifying and Upgrading Training: Data Processing Personnel . . . 44

PREFACE

This publication summarizes a portion of the research conducted under a two-year joint project of the American Society for Training and Development and the U.S. Department of Labor. It represents a brief overview of the findings from our organization and strategic role of training research. More comprehensive coverage of this topic and other findings on the organization and structure of training will be available in 1989 in four books:

ORGANIZATION AND STRATEGIC ROLE OF TRAINING explores how training is structured, financed, and linked to the strategic goals of employer institutions. It also maps the size and scope of training in employer institutions.

TECHNICAL TRAINING examines how technical workers get their training, what it costs, who provides it, how it links to strategic goals, and what the future holds for the technical work force.

ACCOUNTING AND EVALUATION includes an accounting model that represents a tested method of capturing training costs and benefits. It also explores effective evaluation methods that connect training to strategic change.

BASIC WORKPLACE SKILLS maps out the skills that employers want and charts the strategic relevance of each skill. A model for establishing a basic workplace skills program, as well as generic curriculum for each skill, is included. In addition, a comprehensive *BASIC WORKPLACE SKILLS MANUAL* will chart the step-by-step process for establishing a basic workplace skills program. It will include charts and checklists for implementation.

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INTRODUCTION

It is human nature to waste that which is abundantly supplied. Throughout most of this century, there appeared to be an overabundance of American workers.

People were plentiful, but jobs were not. The economy seemed to overflow with underemployed and unemployed people. Unemployment hovered in double digits. Pundits said the technological bogeyman was loose again and labor-saving machinery would soon make *all* workers redundant. But things rarely remain static. As the century moved on, what started out as an excess of American workers has dwindled away to nothing. In fact, by the year 2000, there are likely to be too few well-educated and well-trained workers to satisfy the nation's economic needs.

Americans are slow to recognize the new reality. Recent history encourages us to accept the view that educated and trained workers are abundant, and machinery, financial capital, and natural resources are scarce. This perception began with the Great Depression, which Americans remember as an episode when a dangerous and growing army of the unemployed was dispersed with make-work jobs. After World War II, the economy boomed, fueled by the pent-up demand for consumer goods that had been building throughout the war. Thereafter, growth was sustained by a surge in buying on personal credit. The lesson learned in the postwar expansion was to value people for their purchasing power and not as critical factors of production.

The postwar baby boom has influenced American thinking, also. The United States has been forced persistently to reshape its economy and social structures in order to bear, feed, clothe, educate, employ, and house the 76 million members of the American baby boom. As the boom ages, it has shouldered its way into American hospitals, schools, and labor markets, successively overwhelming each and then leaving it bloated and vacant. People who have had to provide for the baby boom, and the baby boomers themselves, who have spent a lifetime in one queue or another, are easily convinced that there are too many people and too few hospitals, schools, jobs, houses, and new promotions.

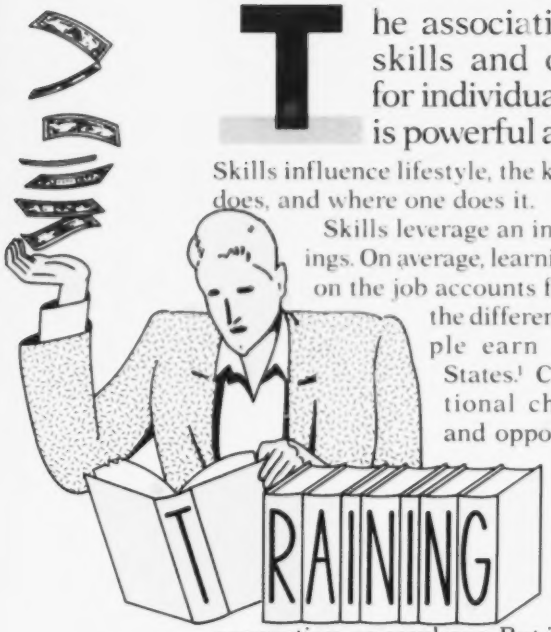
When the baby boom moved into the workplace, it found too few good jobs and promotions to go around. But the generations that will follow will be small in comparison with the baby boom. Unfortunately, the sense that people are oversupplied may mislead Americans into a strategy that favors investment in machines, financial capital, and extracted resources over investments in the education and training of people. In a very short time, however, such a course of action would prove a serious economic error.

This discussion challenges the biases spawned by recent economic history. It begins by explaining the relationship between job-related learning, individual opportunity, and the competitiveness of employer institutions. Next, it examines the dynamics that link changing skill requirements on the job to training and education. This is followed by a snapshot of the existing and emerging institutions that provide job-related training, or access to it. The next section is a closer look at the employer-based training and development system, in general, and the differences between small and large employers, in particular. The following and most sizeable section considers job-related education and training in individual occupations. The discussion concludes with recommendations for improving the nation's job-related education and training system.

PART I

Skills, Individual Opportunity, and Competitiveness

Skills and Opportunity



The association between skills and opportunity for individual Americans is powerful and growing. Skills influence lifestyle, the kind of work one does, and where one does it.

Skills leverage an individual's earnings. On average, learning in school and on the job accounts for about half of the differences in what people earn in the United States.[1] Career and locational choices, chance, and opportunity account for the other half. Each individual may trade earning power for a preferred location, occupation, or employer. But individuals with poor skills do not have much to bargain with; they are condemned to low earnings and limited choices.

Most studies show that, among Americans, about 10 percent of the differences in earnings over a lifetime can be attributed to preemployment learning in school. But this small figure masks wide variations in the importance of education in determining earning potential. For instance, education is more important in determining earnings of employees in high-tech industries than in other industries. In high-tech industries, earnings of a high school graduate are twice those of a dropout; earnings of a college graduate are twice those of a high school graduate; and earnings of someone with a postgraduate education are 30 percent higher than earnings of a college graduate.[2] Ostensibly, education is a particularly good investment in these industries because it prepares employees for the highly skilled jobs these industries generate, and because it produces adaptable employees who can cope with rapid technical change.

Education also improves earnings because it leverages learning on the job. Skills learned in school and skills learned on the job are complementary. For instance, compared with persons who have only a high school diploma, those with two years of formal education beyond high school have a 20 percent greater probability of getting training on the job. College graduates have a 50 percent greater probability of getting training on the job than high school graduates. And in most American industries, workers with education beyond four years of college have a 30 percent greater probability of getting training on the job than college graduates. In high-tech industries, postgraduate education increases the probability of receiving training on the job by almost twice as much as a college degree.[3]

Although educational attainment certainly influences earnings, learning on the job has the most powerful and substantial effect on earnings. Studies by Lillard and Tan,[4] Bishop,[5] and others consistently show that persons who receive formal training on the job enjoy an earnings' advantage of 25 percent or more over those who do not receive formal training in the workplace.

Training in the workplace has effects on productivity and earnings beyond the current job. Most people, after all, use what they learn on their current jobs to get new and better jobs. According to Lillard and Tan, employees who have had some formal training on a prior job earn 18 percent more in their current job than those

who have had no formal training on a prior job. Those who have had informal training on a prior job earn 20 percent more than those who have not had informal training on a prior job.[6]

Workplace training also seems to have a more durable influence on earnings than education and training from other sources. The positive effect of workplace learning on wages lasts 13 years, compared with 8 years in the case of learning in schools.[7]

How training affects earnings depends on the subject matter, as well as the provider. Management training and professional and technical training increase earnings more than other kinds of training (16 percent and 14 percent more, respectively).[8]

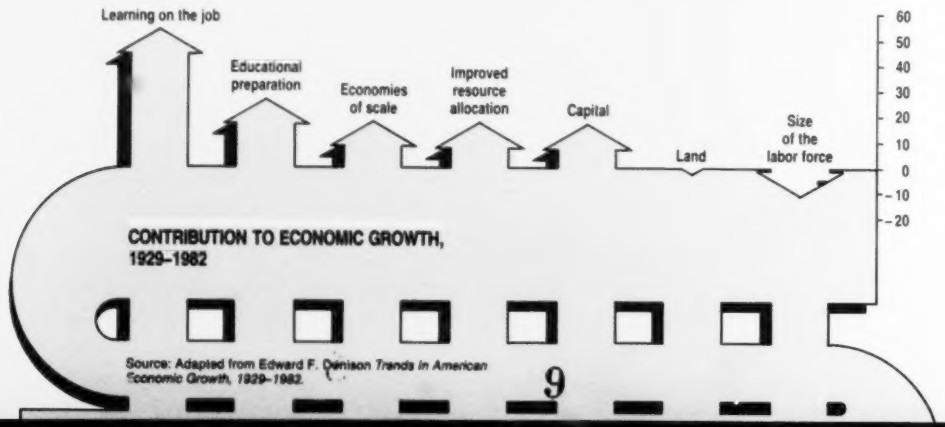
Skills and Competitiveness

Education and training are critical not only to individual opportunity, but to the productivity and competitive advantage of employing institutions and whole nations as well. Learning in school and learning on the job are by far the most important factors accounting for American economic growth and productivity in this century and will determine the nation's economic prospects in the next. In fact, both formal education and learning on the job have been consistently more important than machine capital in expanding the nation's productive capacity throughout this century. Between 1929 and 1982, education prior to work was responsible for 26 percent of the expansion in the nation's productive capacity. Learning on the job contributed over half, about 55 percent, of all improvements in the nation's productive capacity. Machine capital contributed a respectable but disappointing 20 percent.[9]

Further, the economic importance of schooling and learning on the job is increasing. The economic history of the modern world shows acquired human skills inexorably replacing natural and machine resources as the basic building blocks of production and service delivery. In 1890, resources from the earth, including minerals, energy, and food, accounted for 50 percent of the gross national product. Today, these same resources account for less than 10 percent of production and services. In contrast, human resources now account for more than four fifths of the nation's total economic output. The acquired skills and abilities of the population have become the pivotal resource.[10]

In the last century, economists routinely listed land, labor, and capital as the factors essential for economic production, but in the postindustrial economy, land is no longer a prime factor of production. Available data suggest that land played no part in the productivity increases between 1948 and 1966 and had a negative impact on productivity between 1966 and 1978.[11]

In the world economy today, high-skilled, technology-intensive production and services



are concentrating in developed nations, and low-skilled, technology-poor production and services are concentrating in less developed nations. The competitive advantage of the less developed nations lies with their low-wage, low-skilled labor pool. The competitive advantage of developed nations relies on the application of technological advances in combination with an increasingly skilled and adaptable work force. As America's baby boom moves toward retirement and birth rates stay low or decline, the United States will find it increasingly difficult to match sweat equity with the millions of new workers coming of age in less developed nations over the next quarter-century. Consequently, the nation can no longer compete on the basis of low-wage/low-skill production, but must shift to a service- and information-based economy in which highly skilled persons and large doses of technology are the critical factors of production.

In the United States, a mutually reinforcing mix of economic, technical, and demographic factors is bringing the human capital issue to the forefront of national concern. Employers are increasingly dependent on the skills of all their employees for improvements in efficiency and quality, customer service, and the development of new applications for existing products and services. This increasing reliance on human capital in the workplace is on a collision course with the emerging demographic reality in the United States: the quantity of human resources available for entry-level jobs is declining. Moreover, the quality of entry-level employees is declining as more and more young workers are drawn from populations with insufficient human capital investments prior to work. The United States faces a growing human capital deficit that threatens both its competitiveness and its ability to provide work for every able-bodied American.

The Competitive Cycle

The competitive cycle is the process by which innovations are developed and brought to the marketplace. This cycle can be divided into four phases:

- discovering or developing an innovation, such as a cost saving, quality improvement, or new product or service;
- tailoring the innovation to the employer's institutional culture, strategic niche, and production or service delivery system;
- utilizing the innovation in production or delivery of the new product or service to the marketplace; and
- developing new applications for the innovation.

"Cycle time," the time it takes to turn innovations into cost savings, quality improvements, or new products or services, is critical to winning economic competition. The speed with which individual employers and whole nations get innovations into the marketplace separates the economic winners from the losers. Learning and skill development are key ingredients in developing innovations and reducing the time it takes to get them to the marketplace.

Learning is critical to the competitive cycle from the very beginning. In order to generate innovations, employers need to be able to learn from their own employees and customers, as well as the outside world. In the initial discovery phase of the cycle, employers need structures that allow them to learn from the external research and development (R&D) community. They also need internal structures that allow them to learn from their own employees' experiences in producing and testing products and services and from their customers' use of existing products and services.

In the tailoring and design phase of the competitive cycle, roles are uncertain, job assignments are broad and overlapping, and employers rely heavily on employees' creativity, problem solving and team skills. The more involvement on the part of all the affected employees, the better. An elitist approach to tailoring and design can lead to production or service delivery problems down the line.

In the production or service delivery phase, the employer relies on the skills of production and service workers to implement the original design and to develop new quality improvements and cost-effective ways to produce products or deliver services. Similarly, in the final phase of the competitive cycle, the employer

relies on employees with hands-on production and service delivery experience or customer contact to develop new applications for the original innovation.

The American Context

Cycle time is generally too long in the United States. It takes the Japanese 40 months to get a new car to market; it takes Americans 60 months. The United Kingdom is able to get pharmaceuticals to the market in 2½ months, one half the time it takes American pharmaceutical companies.

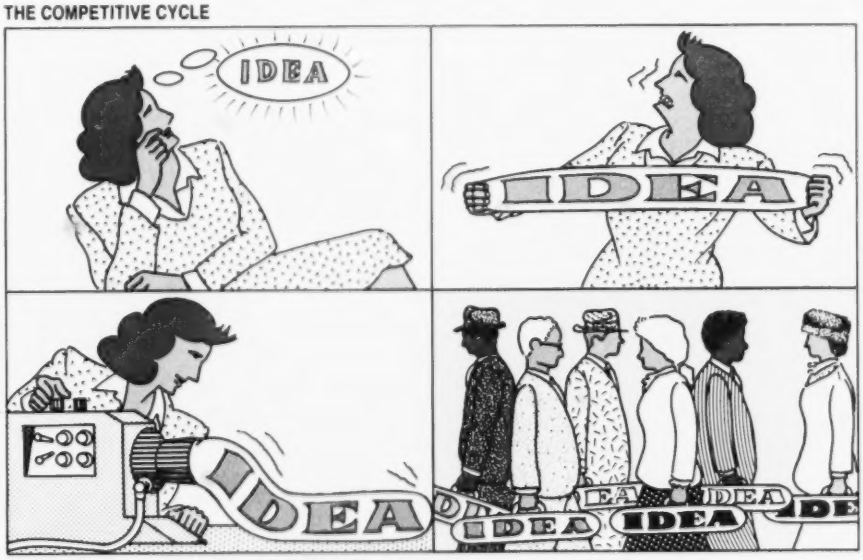
The strength of the American economic system has always been in the early phases of the competitive cycle. The United States has always been good at initial innovation, but less competitive in the production phase. Not surprisingly, the nation's learning system demonstrates parallel strengths and weaknesses. The elementary and secondary schools are good at providing academic preparation for the college bound, but less good at educating and training noncollege-bound youth.

Occupational preparation for noncollege-bound youth has less standing than academic preparation in the American education system. As a result, academic learning suffers from not being more applied, and applied learning does not meet basic academic standards. The postsecondary education system is strongest in the four-year institutions that produce professional, managerial, and technical elites critical to initial innovations. Except for a scattering of excellent junior colleges, technical schools, and some training in the military, postsecondary education and training for noncollege youth is often weak or nonexistent. Unfortunately, however, it is the noncollege youth who eventually work at the point of production or service delivery. Their lack of preparation makes us less competitive in the production and delivery of products and services and the development of new applications.

Employers' strengths and weaknesses in connecting learning to the competitive cycle are parallel to those of the educational system. In general, the American employer relies on external R&D for new strategies, technologies, products, and services. To the extent that employers do have R&D systems, they tend to focus on the discovery and design phases of the competitive cycle and rely heavily on managerial and technical elites. Relatively few American employers have systems for using production, service delivery, or customer service workers to improve efficiency, improve quality, or develop new applications.

Employers' training systems mirror these tendencies. Only a third of the nation's employees get any formal training at all after they go to work. Informal training, such as coaching, is three to six times as common as formal training. Training and development is concentrated among white-collar and technical elites, with production and service delivery personnel receiving much less training.[12]

THE COMPETITIVE CYCLE



PART II

A Map of "The Learning Enterprise"

Any attempt at mapping the American learning enterprise needs to begin with a warning: The American learning enterprise is a crazy quilt of institutions and programs that serve varied purposes. There is no *best* institution, no *best* education or training practice, or no *single* education and training objective that dominates all others. Everything seems to work somewhere, and nothing works everywhere.

The following map is an attempt at a rough ordering of the learning enterprise. It begins with a description of the process by which changes on the job accumulate into new training and education requirements, followed by a thumbnail sketch of the various institutions on the education and training landscape. The final section in Part II takes a closer look at workplace learning in small and large employer institutions.

Changing Skill Requirements

It is difficult to unravel the complex set of forces that result in skill change in the workplace. As with so many processes in the real world, causes and effects are so tightly tangled that they are difficult to separate from one another. Choosing a strand to begin loosening and unraveling the knot of economic change is largely a matter of taste. It is useful to begin with technology because it is the most obvious strand. Technology tends to be tangible. Moreover, in recent years, technology has been primary among the various forces that have led to changes in work requirements.

The most obvious result of new technology is that people need more and better skills. In general, employees need good reading skills to read operating manuals. In manufacturing, they need better computational skills in order to set the specs and sizes of particular product runs, as well as to provide some statistical control over quality. The new information technology allows a service deliverer to access, use, and contribute to the employer's entire information base, so service employees require computational skills to use and record quantitative information accurately and effectively, especially in mathematically-based industries, such as finance, insurance, and real estate.

A related effect of new technologies is that they make individual employees and working teams more autonomous. Production and service delivery employees are able to control the overall shape and quality of their products or services. Also, products and services can be tailored for individual customers. Moreover, technology tends to diversify product offerings. For example, the financial services industry now offers a panoply of financial services, rather than relying almost exclusively on checking. And the communications industry no longer relies so heavily on telephones.

Many employers have recognized the importance of the autonomous employee for efficiency, quality, customer relations, and the development of innovations and new applications for existing products and services. These employers have concluded that traditional top-down authority structures frustrate the autonomous work team and reduce efficiency and quality, thwart good customer service, and do not take advantage of the ability of either the autonomous worker or the autonomous work team to develop new applications and innovations. The result has been experimentation with decentralized institutional structures that push

authority and resources toward the point of production and service delivery. Managers maintain control by flattening hierarchies to improve communications between managers and front-line employees. Because it is difficult to manage the autonomous employee or the autonomous work team, managers focus on the outcomes of work efforts and not on the control of work processes. They rely on outcome measures of efficiency and quality and, if outcomes prove unsatisfactory, they intervene to provide resources for improvement.

The autonomous employees in the brave new workplace require substantially greater skill than their predecessors. They need self-management skills. They need teamwork skills to be effective members of the working team. They need interpersonal and communication skills to interact with customers, superiors, and teammates successfully. And they need organizational skills to be successful in the flattened, more flexible organizational structure.

Technical changes affect skill and learning requirements by changing the nature of jobs. Sometimes technical change can eliminate whole job categories. The internal combustion engine eliminated the buggy whip maker. The automatic elevator eliminated the elevator operator. Usually, changes accumulate in small doses, altering occupations over time through informal learning on the job. In some cases, skill changes accumulate to the point where they recombine several labor-intensive jobs into fewer jobs for more highly skilled employees who use more technology. This has been the case with much of the recent technical change.

Over the past decade, the most prominent example of this process has taken place on the factory floor. At one time, the machinist was the leader and central figure on the working team, whose job was to apply various technologies to shape individual parts of a final product. Career advancement depended on sharpening the essential job skill of hand-to-eye coordination. Eventually, when the machinist's hand-to-eye coordination skills were good enough, he or she became a tool and die maker. Enter the robot, with more consistent hand-to-eye coordination than the machinist. The robot took the machinist's place.

At the same time, the technology of advanced automated manufacturing began doing the jobs of other members of the shop floor team, including the laborer, the materials handler, the operator-assembler, and the maintenance person. Ultimately, all these jobs became one job for a single employee, the manufacturing technician. Although the new job may not require the same depth of skill in each of the more narrow jobs it absorbed, it does require a wider variety of basic skills than any one of the other jobs.

The expanding range of tasks and responsibilities in the manufacturing technician's job demands higher levels of reading, writing, and computation than the old factory jobs. Generally more autonomous than the machinist, the technician must have more personal management skills. Also responsible for trouble-shooting, maintaining, updating, and exercising quality control over highly complex, mathematically-based machinery, the technician must have better computational skills and be able to read and to comprehend technical manuals. In addition, these new tasks demand the skills to adapt successfully to the job—learning to learn, creative thinking, and problem solving.

There are other current examples of the same phenomenon in other industries. In services, the secretary is evolving into the information manager, and the bank teller is becoming the financial services portfolio consultant for individual customers.

Translating Skill Change Requirements Into Education and Training

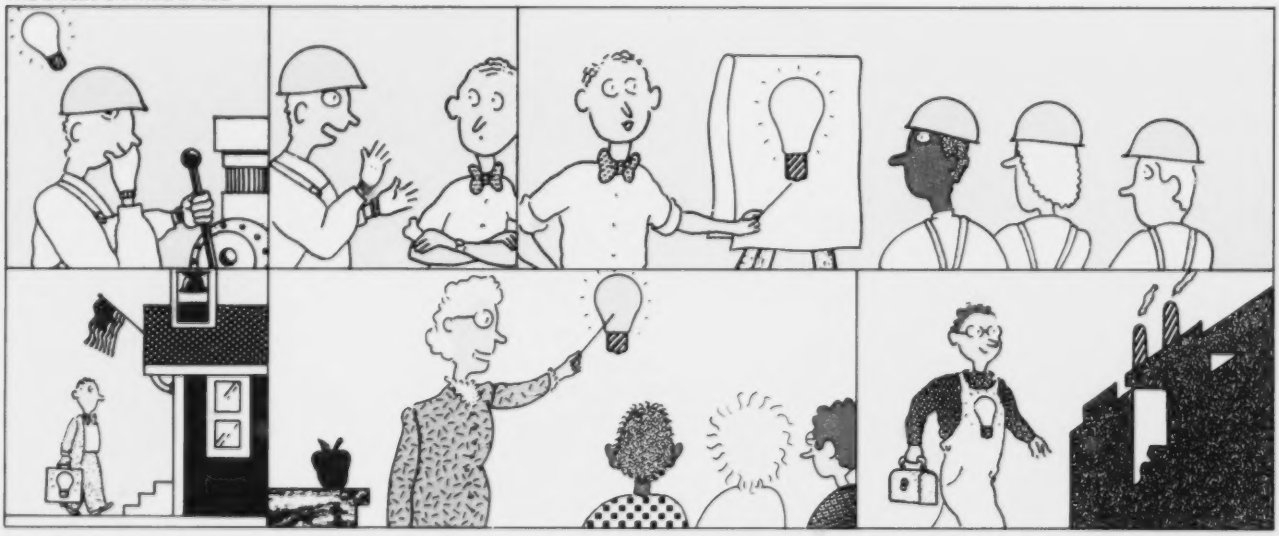
Technical, strategic, and other factors that change skill requirements give rise to new learning needs. In broad terms, the learning response to changing skill requirements moves through a regenerative cycle that begins with the need for informal training to satisfy new job requirements. As the requirements become more wide spread, the institutional learning emphasis shifts to the external providers of formal education and training. The learning cycle comes full circle when graduates and completers of formal training enter the work force and, in turn, create new learning requirements which begin the cycle all over again.

The initial phases of a major innovative change are highly unstructured. Job assignments are broad and overlapping.[13] The implications of the innovation for individual jobs and skill requirements are unknown. New learning tends to be experimental, informal, and on the job. The novelty of training needs precludes buying training from external providers. Moreover, at this stage, many employers view their new knowledge as a competitive advantage and, therefore, proprietary.

Eventually, the employer institution integrates the innovation into the production or service delivery system, and new skill requirements become known and stabilized. Job assignments become more specific, and production or service delivery more routine. At this juncture, new training needs can become more formalized, and if they extend to a sufficient number of people, formal courses become cost-effective. Depending on the number of employees involved, employers will either provide their own training or buy customized training from outside providers who can customize training tailored to particular employer needs.

Job-specific skill changes can accumulate to the point where they affect the occupational and professional education system, located primarily in secondary and postsecondary voca-

THE SKILLS CHANGE CYCLE



tional schools. Skill changes may even create whole new occupations and professions. Manufacturing engineering is a recent case in point. Initially, employers developed their own manufacturing engineers by upgrading the skills of supervisors and machine operators with informal on-the-job training (OJT) and, later, formal training. Eventually, the noncollege occupational training system began to offer more generic training programs, and when sufficient theory accumulated to complement applied knowledge, academic courses began to appear in college and university engineering programs. In the end, manufacturing engineering became a professional specialty in the engineering community.

When accumulating skill changes increase basic educational requirements, elementary and secondary schools are affected, too. For example, as discussed earlier, today's new mathematically-based technologies require better computational and literacy skills, and the structures require employees with more interpersonal and organizational skills. The increased importance of the working team suggests the need for better communications and teamwork skills.

Of course, not every skill change evolves directly into a major new skill requirement, a whole new occupation, or a new basic skill requirement. In many cases, the need for incremental skill changes that occur after a particular innovation require less and less upskilling as time goes by.[14] The skill requirements of a job may actually become less for a time, as tasks are automated and human responsibilities become fewer and more routine. At some point, however, jobs with limited and routine responsibilities are automated out of existence or integrated into other jobs, adding both machine capital and responsibility into those jobs and increasing skill requirements.

The Institutional Landscape

Whether for upgrading current employees or preparing entry-level workers, employers and external education and training institutions are partners in the learning enterprise. This section describes briefly the various institutions involved.

Elementary and Secondary Schools

The elementary and secondary school system is the largest component of the nation's education and training system. The nation's public and private elementary and secondary schools currently serve 40 million students at a cost of $150 billion per year.

Schools serve three masters: American culture, the political system, and the economy. American culture values individualism above all else, and the American political system is predicated on participation. Thus, the schools are responsible for developing autonomous individuals who can contribute to the American community and participate in the American political system.

The economic role of the schools is pivotal. The schools are charged with husbanding and disseminating knowledge that will create the next technology and the next set of employers, jobs, and employees. In the short term, however, the quantity and quality of jobs are essentially given, and education has only a marginal effect in creating jobs by making high-quality labor a better investment than machine capital. The schools' short-term mission, therefore, is to educate for existing jobs. They do so by providing generic basic skills to make people ready for work and for learning on the job. In addition, the nation's secondary schools provide occupational education to about 5.5 million students at a cost of about $6.5 billion per year.

The school system's ability to prepare people for work is the keystone to its cultural and political roles. American society is based on work. A job is the symbol of personal worth and the price of admission into the mainstream of the American community. Persons unprepared for work disappear from the community, drop out of the political system, and fall into the underground cultures and economies outside the mainstream of American life. The United States' huge investments in schooling reflect the nation's faith that education creates an autonomous and economically independent citizenry ready to participate in culture and polity.

Arguably, the nation's schools are its most effective institution. As of October 1985, 86.5 percent of whites, 82.5 percent of blacks, and 70 percent of Hispanics had received a high school education. Overall, 86 percent of young adults ages 25 to 29 were high school graduates, twice the percentage for 1940. The annual dropout rate fell from 6.3 percent in 1973 to 5.2 percent in 1983, with young black men showing the most improvement.[15]

Despite these gains, there are considerable educational attainment gaps, particularly that remain among race and ethnic groups and various economic strata. Black and Hispanic teenagers are far more likely to leave school before graduating than are white youths, and poor youths, regardless of race or ethnic group, are three to four times more likely to drop out than students from higher income families. In 1985, only 56 percent of black and 53 percent of white 18- to 21-year-olds from poor families had earned a high school degree. Hispanics at all economic levels are especially at risk for leaving school early.[16]

Concern for the quality of schooling has moved beyond the traditional focus of the economically and educationally disadvantaged to concern for the schooling of all the nation's children. This broader interest was best expressed in a report by the U.S. Department of Education, which warned dramatically that the educational foundations of American society are presently being eroded by a rising tide of mediocrity that threatens the nation's future.[17]

Educational reform has become a top priority for politicians and policymakers concerned about national competitiveness. While there is still a job to be done in eliminating dropouts and providing access for special populations, the schools have performed a remarkable feat in their improvement in the rate of high school graduation. However, elementary and secondary schools must contribute to the nation's productive capacity by continuing to make focused quality improvements. So far, reforms have been on the right track by putting greater emphasis on improving basic academic skills (reading, mathematics, and the sciences); expanding the traditional curriculum so it now includes the interpersonal, teamwork, and organizational skills needed in the workplace; improving the quality of teaching/training; and testing both teachers and students for subject competency attainment.

Of particular concern to education reformers is the quality of education available to general and vocational education students, who together make up about 61 percent of the high school student population. This "other half" of the high school graduating class appears to be receiving a poor basic skills education and outdated occupational preparation that ultimately limits their opportunities and effectiveness in the workplace. Reformers tend to agree that this population requires new curricula that integrate the basics with job-related learning.

Colleges and Universities

The college and university system prepares the nation's white-collar and technical elites, including managers and professional specialists (e.g., teachers, scientists, engineers, doctors, lawyers, accountants). The United States supports 156 universities and 1,853 colleges with a combined enrollment of almost 8 million students. These institutions spend almost $80 billion annually, or roughly $13,000 per student.

Twenty-two percent of all 25- to 29-year-olds have completed four years of college, nearly double the figure for 1963 and four times the percentage in 1940. Long-term relative educational gains for black youth have been even more dramatic than for white youth. The pro-

portions of both high school and college graduates among black youth have risen sevenfold since 1940.

College and university graduates tend to keep their skills current, whether to meet certification or licensing requirements or to meet self-imposed standards of their professions or occupations. They rely more heavily on schooling to prepare for work than do other Americans. Their upgrading after employment comes from a mix of postgraduate education, the offerings of professional societies, and employer-sponsored training. Compared with other Americans, college and university graduates get the most preparation before they go to work and the most formal and informal training while they are on the job.

Colleges and universities provide more qualifying and upgrading training for Americans than all other schools combined. They provided qualifying training for 16.1 million persons and upgrading for 5.5 million persons in 1985.[18]

But their economic importance is not limited to their ability to teach and retrain Americans. The four-year institutions are also a principal source of the nation's R&D, which ultimately drives new innovations, skill change, and education and training requirements.

The importance of college education is not likely to decrease any time soon, given the importance of R&D and the fact that, with the exception of teachers, occupations requiring college degrees are the fastest growing. Moreover, as high school completion rates continue to increase, quality improvements in high school education, college, and other forms of postsecondary education will be the principal means for leveraging the economic contributions of education in the United States.

The principal challenge for American colleges and universities will be to find ways to deliver education less expensively to students in order to reach a wider student population. The need to reduce costs will be compounded by the fact that as more and more jobs require college education and more and more workers have college degrees, the competitive advantage of college degrees will decline, driving down the value of the degree relative to cost. The relative costs and returns may encourage many people to attend two-year schools and other kinds of postsecondary institutions. Evidence suggests these dynamics have already begun.[19] To reduce college costs to American families, people are calling for a mix of cost-cutting in the colleges and larger public subsidies to families with children in school and to students.

Increasing college enrollments are due not only to the large number of young people of college age, but also to an increase in the number of older students. Between 1972 and 1976, the proportion of students age 25 and older in four-year institutions rose from 28 to 33 percent of the total college population. Much of the increase is attributable to female college students over age 35. Their number climbed from 418,000 in 1972 to 700,000 in 1976, a 67.5 percent increase. Enrollments for all persons age 25 and over increased 44.6 percent during this same period.[20]

Although colleges and universities have long been involved in the education of adults through their continuing education and extension departments, the shift to an older student population has led to (or perhaps been partially caused by) a need for new options to accommodate their changing requirements. Admissions and formal entry qualifications have been eased, classes are scheduled at times and places more convenient to working adults, radio and TV have been used to transmit course material, and independent study has been encouraged. A few colleges and universities also provide credit for nontraditional learning experiences in various external degree programs. As the United States' population continues to age, colleges and universities will undoubtedly face an even greater challenge in adapting to the needs and expectations of an older citizen.

Postsecondary Occupational Education

The postsecondary occupational education system is the principal system for preparing and upgrading the half of high school graduates who do not go on to college and who ultimately populate the nonsupervisory work force as

technicians, technologists, and craft and skilled workers. Vocational schools, junior colleges and technical schools, the military, and employers are the principal providers of occupational education after high school.

The junior colleges and technical institutes are the foremost providers of qualifying training and upgrading in this system. According to the Bureau of Labor Statistics, junior colleges and technical institutes provided qualifying training for about 5 million workers and upgrading for 3.3 million workers in 1985.[21] These schools tend to provide job-related education for a highly motivated group of noncollege students (nurses, health technicians, electricians, computer technicians, etc.).

Junior colleges and technical institutes have become an increasingly important source of occupational training in communities across the Unites States. In 1933–34, there were only 532 two-year colleges nationwide, with an enrollment of just over 110,000; in 1983–84, the number of two-year institutions had risen to 1,219, and full-year enrollments to nearly 5 million. About 55 percent of all college freshmen were enrolled in community, technical, and junior colleges. Counting the estimated 4.5 million noncredit enrollees, total enrollments in junior colleges and other two-year institutions reached nearly 10 million in 1983–84. Reflecting the attraction of community colleges to adult learners, the average age of the student body is 29.[22]

The appeal of these institutions to adult learners derives from a variety of factors, including affordable tuition and fees,[23] liberal admission policies, accessibility (courses are frequently offered on-site at businesses, union halls, and other off-campus areas), a wide range of course offerings, and flexibility of class scheduling (most schools are open from early morning to late evening). Flexible scheduling is especially important because a large percentage of both full-time and part-time students at these schools are employed while attending classes.[24]

In addition to the junior colleges and technical institutes, there are noncollegiate vocational schools. They provide job-related training in many of the same areas as the junior colleges, but tend to specialize in less technical fields, such as barbering, hair dressing, and truck driving. These institutions provided qualifying training for 3.7 million workers and upgrading for 1.6 million workers in 1985.

Vocational institutions are the likely training vehicle for the growing mass of technicians in manufacturing and service industries, especially health care and financial services. These schools offer a relatively cheap alternative for human capital development beyond high school. The major challenge that confronts them is the quality of their offerings and their ability to provide access to four-year schools for graduates who want to move to full professional status.

Military training, also part of the postsecondary occupational education system, accounts for the largest share of government training expenditures. For fiscal year (FY) 1989, $17.6 billion was appropriated to provide 249,168 "man years" of training to persons in all service branches.[25] The types of instruction offered included basic recruit training, officer preparation (Reserve Officers Training Corp (ROTC), military academies, Officers Candidate School (OCS), etc.), medical training, professional development, and reserve training.

In addition to the basic and specialized training offered by the military, each service branch has developed cooperative arrangements with civilian schools to enable service personnel to earn high school diplomas or work toward college degrees. Several credit-by-examination and correspondence programs are offered, also. Finally, the Army, Navy, and Marine Corps have developed registered apprenticeship programs, which enable enrollees to receive credit for their service experience in civilian apprenticeship programs.

According to the Bureau of Labor Statistics, the military has provided qualifying training to almost 2 million Americans currently in the workforce. Job-related training in the military is concentrated in electronics, computers, and aircraft engine repair.[26]

The military uses distinctive training technologies and methods of delivery. Its principal

contribution is to develop training practices and technologies and disseminate them to the civilian education and training institutions.

Formal Apprenticeship Programs

Formal apprenticeship programs, which now apply to some 415 trades, include both classroom instruction (a minimum of 144 hours a year) and hands-on learning (a minimum of 2,000 hours, or one year of OJT). Under the National Apprenticeship (Fitzgerald) Act of 1937, unions and employers determine their own requirements and administer their own training programs within the framework of basic standards laid down by State Apprenticeship Councils or the Bureau of Apprenticeship and Training, U.S. Department of Labor. If an apprenticeship program meets these standards, it is "registered," and persons who successfully complete the training receive certificates of completion that entitle them to the perquisites of skilled craft workers.

Training periods range from one to six years, depending on the degree of skill involved, with most trades requiring from three to four years of instruction. While they train on the job, apprentices are paid at progressive wage rates, starting at about half the journey level rate and reaching up to 95 percent of full pay near the end of the apprenticeship period. Persons who complete programs are usually among the highest paid skilled workers.

Usually, apprenticeship programs accept applications for only a few weeks each year, and the number of openings is limited. Application to an apprenticeship program generally requires a high school diploma or its equivalent, a written examination, and an oral interview. Despite efforts to lower perceived barriers to training for women and minorities, such as the Targeted Outreach Program, which was funded under the Comprehensive Employment and Training Act of 1972, the proportion of minorities and women enrolled in apprenticeships has never been high.

Technical instruction as a part of apprenticeship training is given in local vocational schools and junior colleges and, in some cases, home study courses may also be accepted. Provisions of the Smith-Hughes (1917) and George-Barden (1946) Vocational Acts, as well as the Vocational Education Act of 1963, have permitted states with approved apprenticeship programs to receive partial reimbursement from federal funds for salaries of teachers and vocational administrators.

In 1988, there were 303,000 registered apprentices receiving training. More than 38,819 apprentices completed required training in 1988, and 100,440 were newly indentured (i.e., formally accepted as apprentices). Slightly more than 60 percent of the registered apprentices in the country were in building trade occupations, nearly all of them in the unionized sector. Programs in three construction trades—carpentry, electrical, and the pipe trades—contained almost 40 percent of all registered apprentices.[27]

In concept, apprenticeship is the ideal job-related training program. It mixes academic and applied learning, allowing learners to support themselves while they learn. It is a way for employed workers to upgrade their skills and occupational standing while still on the job. It allows for an applied evaluation of curricula by testing or observing job performance.

The principal difficulty with apprenticeship is its limited application among the nation's occupations and industries. Proponents of apprenticeship have suggested extending the model through third parties, such as professional, trade, employee, and other interested associations.

Second Chance Training

The second chance training system is composed of both public and not-for-profit institutions that offer federally funded, locally delivered public programs to persons who are not receiving training from either the public schools or employers. It provides assistance for dropouts, persons who have failed or are likely to fail the transition from school to work, the underemployed, the working poor, and persons

who have been dislocated from their jobs with dim prospects for reemployment. Almost 40 million Americans currently fall into one or more of these categories. The second chance system performs a brokering function between its clients and employers, using small doses of education, training, and job search assistance to help the disadvantaged find work and access to learning on the job.

The history of the second chance system demonstrates a steadily increasing involvement of employers. Because early experience showed that learning outside the context of a job or a real job prospect had little positive effect on improving employment opportunities, legislative changes have progressively attempted to strengthen the relationship between the second chance system and employers.

The current demography has created a window of opportunity for the second chance system. The declining quantity of entry-level employees has created common cause between the second chance system and employers. As entry-level employees become more and more scarce, more and better jobs become available to the disadvantaged and dislocated workers who are clients of the second chance system. The emerging strength of this system stems from the fact that its goals of opportunity and social justice are increasingly consistent with the public and private pursuit of the nation's economic competitiveness.

The principal programs that make up the second chance system are funded primarily under the Federal Job Training Partnership Act (JTPA) passed in 1982, and also under the Work Incentive (WIN) Program, part of the Aid to Families with Dependent Children (AFDC) Act. The JTPA has now been in operation for several years and emphasizes:

- public-private partnerships;
- performance standards;
- coordination of training services with other human service agencies;
- state and local administrative control; and
- access to work and career development rather than welfare.

Most observers agree that all these programmatic emphases should be continued and strengthened.

The Career Support System

The emerging career support system is a set of experimental policies and programs that are loosely connected by a common intention to give employees and their families more control over their working lives. On the whole, this system represents a profound shift in the focus of the national dialogue on human resource development; the public interest in developing human capital has moved beyond an exclusive concern for the disadvantaged to a new focus on the mainstream working population.

From the demoralizing example of dislocated workers, Americans are learning that competition intensifies economic and technical change, requiring a more flexible work force and loosening the ties between employer and employee. Most Americans believe that they now have diminished job security and must take more responsibility for their own career development. They also believe that in order to shoulder this new responsibility, they will need a bag of new tools, including advance notification of plant shutdowns; involvement in economic and technical changes that affect them at work; access to retraining to help them keep pace with economic and technical change; and portable health care, day care, parental leave and pensions to sustain them and their families on and off the job.

Thus far, the emerging career support system is more dream than reality. It consists of (1) training and other labor market services in collective bargaining agreements and (2) limited public experimentation with training provisions for employed adults.

It is difficult to judge the future of the career support system. The services involved are expensive, and the federal government has insufficient resources to afford them. If costs are foisted on private employers, they will have less investment capital available, and individual jobs will be so expensive that employers will be unable to hire as many full-time workers as

they otherwise might. The public seems unwilling to tax itself to pay for these services. In the end, a mix of governmental, employer, and individual contributions will have to be negotiated, and benefits of this kind will be affordable only if they are expanded gradually.

The Training Industry

The training industry provides training tailored to the needs of specific employers. Large companies buy almost 40 percent of their formal training from outside providers, mid-sized employers buy an even larger share of their training outside, and small employers go outside for nearly all their formal training.

Higher education institutions, private, for-profit companies, professional societies, and a host of individual consultants provide training for managerial and technical elites. Training for technicians and craft and skill workers is available from junior colleges, postsecondary technical schools, and private providers. Vendors and consultants provide most sales training. Industry and trade associations provide a full range of managerial, technical, and sales and marketing training.

Employer-Based Training and Development

Employer-based training and development, along with selection, appraisal, and rewards, is one of the human resource management systems usually found in employer institutions. The principal objective of the employer-based training system is to serve the strategic goals of the employer institution through two different kinds of training: formal course work and informal on-the-job training. Currently, employers spend about $30 billion for formal training and anywhere from $90 billion to $180 billion for informal training.[28] Informal training is the principal means by which technical, economic, strategic, and regulatory changes are gradually integrated into the workplace, especially among the nation's small employers. Employers either provide their own formal training or buy it from outsiders.

Lately, there has been a growing public interest in employer-based training, both to avoid employee dislocation and to encourage competitiveness. Dislocated employees rarely end up better off, even after sincere public efforts to help them. Many observers, therefore, have concluded that policies for dislocated employees provide too little, too late. They think training on the job would discourage dislocation, or at least provide the kind of job-related learning that would be most helpful in the event dislocation is unavoidable. Other people assert there is a public interest in employer-based training in order to improve the nation's competitiveness or the development prospects of state and local economies. Their principal interest is in improving the performance of employer institutions.

Most states now have "customized training" programs in which public institutions provide training tailored to the needs of individual employers. Many states are experimenting with programs that encourage employers to do their own training or buy training from public or private suppliers. In addition, federal job training programs allow a small amount of available funds for economic development to be used to minimize dislocation and create jobs for the disadvantaged and dislocated. More extensive policies that have been proposed would use public and vocational schools, internships, apprenticeships, and tax incentives to employers to increase the quantity and quality of employer-based training.

Employer-Based Training and Development: A Closer Look

Learning on the job is nothing new. Most people learn their jobs on the job. Most get ahead by leveraging what they learn in the current job into a new and better job. Moreover, for many people, a job is the best teacher. Relatively few people excel in academic settings, but almost everyone is able to learn on the job, either by doing the job, by being coached by peers or bosses, or by attending formal courses provided by the employer. Applied learning, learning done in the context of a task, has inherent advantages as a pedagogy for both employers and employees. Individuals can learn at their own pace on the job and they are encouraged to use, rather than lose, new knowledge. Finally, individuals are motivated to learn on the job because increased proficiency brings immediate rewards, in terms of achievement, status, and earnings.

The employer's interest in learning tailored for the workplace, as distinct from more general academic preparation, stems from the fact that on-the-job learning is directly supportive of the employer's institutional culture and strategic goals. Such training occurs in the context of the employee's working team, encouraging efficiency in the work group. In addition, employer-based training occurs in the context of the employer's strategy, products, and market niche, thereby encouraging new efficiencies, quality improvements, and innovations.

The national interest in employer-based training stems from the fact that learning systems in the workplace are the first line of defense against economic and technical changes. The ability of the nation's employers and employees to respond expeditiously to these changes determines, in large part, the nation's adaptability and competitiveness.

Although employees have always learned on the job, the training process has changed substantially in form. The fundamental dynamic has been a consistent shift from informal toward formal learning. As the pace of economic and technical change has accelerated over the past half-century, employers have tried to assure the efficiency and quality of learning by formalizing informal learning processes. Employers have managed to maintain the link between learning and real jobs by applying a careful methodology that translates real-world learning needs into structured learning programs. This methodology, called "instructional systems design," is an applied approach to learning. The strength of this applied approach is that it strays as little as possible from the workaday reality of the job and the employee. It begins with with a careful analysis of the gap between job requirements and the employee's skills and ends with an evaluation of the employee's performance on the job.

Employer-based training is not lacking in importance, size, or scope, but lacks cohesiveness and presence and is largely invisible. This shadow education system is delivered by no single institution, is the subject of no law or policy, and functions quietly and efficiently, growing invisibly, a silent postscript to the employee's formal education. Even now, executives, managers, supervisors, and others train without the direction or assistance of training professionals. Most people involved in employer-based training do not recognize that they are part of a training system. Most trainers see themselves as managers, engineers, marketers, chemists, or sales managers, for example. They tend to be rewarded and recognized by their peers on the basis of their professional expertise, rather than their ability to train and develop employees. It is only recently that training has finally taken its place as an institutional function and professional discipline in the consciousness of institutional leaders, in business school curriculums, in the business press, and

in the thinking of business leaders, theorists, economists, and politicians.

The current organization and delivery of learning in the workplace reflects its roots at the worksite. Most learning on the job is still located as closely as possible to the job itself. Even in large employer institutions, training departments tend to supply less than half of the formal training and development the employees receive. There are exceptions to this rule, however. Training intended to provide skills beyond the needs of the current job tends to be centralized at the corporate or divisional level. Developmental programs for certain occupations, such as scientists, engineers, and executives, and the developmental aspects of the training of senior managers are also centralized.

Some kinds of training and development are centralized because they are new. A new product, strategy, or technology may require training large groups of employees as quickly and consistently as possible. Employers, therefore, tend to provide centrally controlled training in the initial stages of innovations. Once innovations are in place, however, training tends to become decentralized to fit the specific purposes of divisions and individual job categories. Some training is organized around specific institutional purposes, product lines, or strategies. The training of sales, marketing, and customer service personnel, for instance, tends to be organized around specific products or strategic units at the division level.

Most training is, and ought to be, provided at the worksite, where changes in learning requirements have their first impact. Individual plants or branch offices direct most supervisory training, skill training, and supplier training.

How do the nation's employers apportion their training investment? Employers spend about $30 billion per year in direct costs for formal training courses that they either provide themselves or buy from outside suppliers. The current average expenditure is about 1 percent of payroll, but expenditures of 2 percent of payroll are not uncommon. Expenditures of 3 and 4 percent of payroll are more rare, but not uncommon among training-intensive employers.

Table 1 shows the distribution of formal

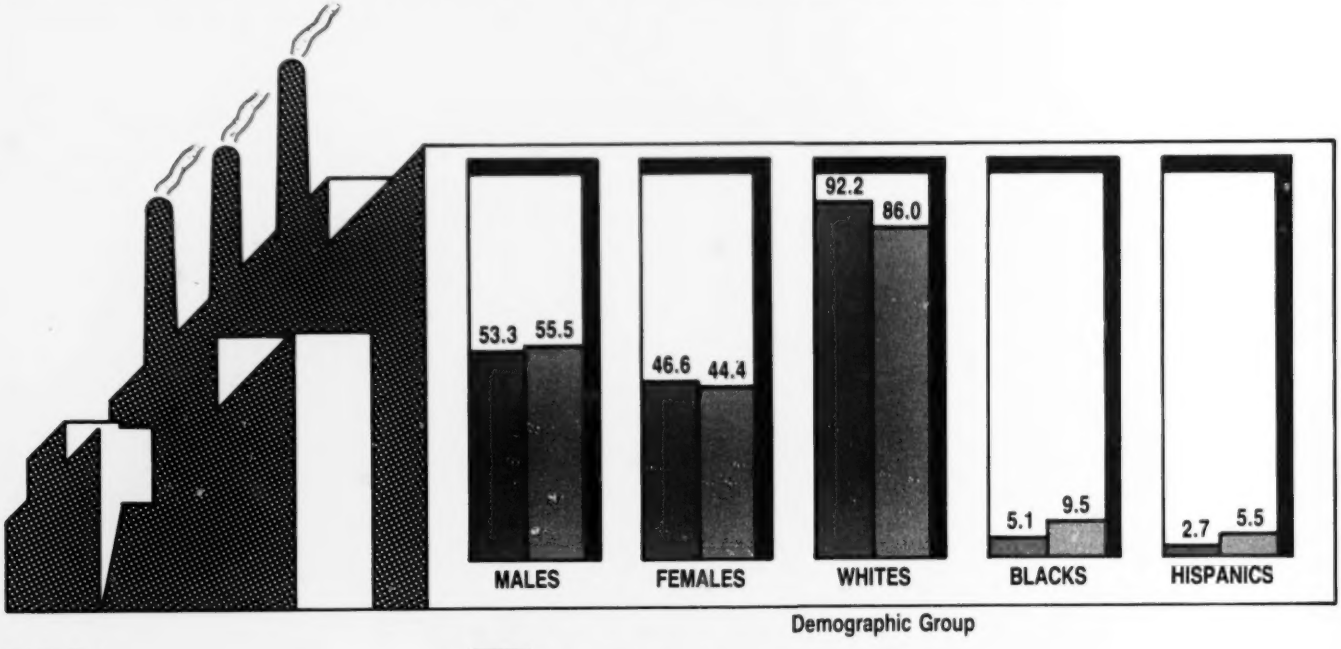


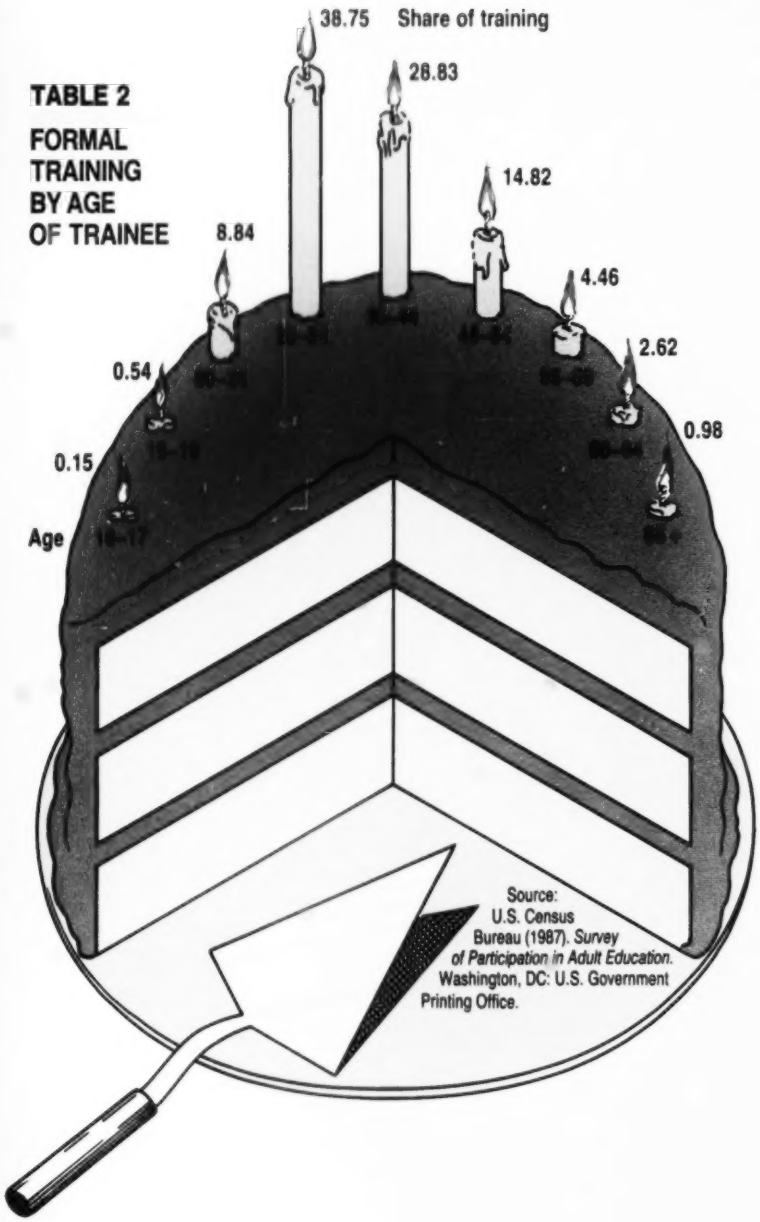
TABLE 1

FORMAL TRAINING BY SEX AND RACE OF TRAINEE

Source: U.S. Census Bureau (1967). *Survey of Participation in Adult Education.* Washington, DC: U.S. Government Printing Office.

TABLE 2

FORMAL TRAINING BY AGE OF TRAINEE



employer-based training by sex and race. Women receive a slightly disproportionately large share of training relative to their share of employment. Whites receive a disproportionately large share compared with Blacks and Hispanics.

Most formal employer-based training—68 percent—is provided to employees between the ages of 25 and 44 (Table 2).

Employers provide 69 percent of their formal training themselves and buy 31 percent of their formal training from outside providers.[29] Table 3 outlines the relative importance of the various outside providers.

How extensively formal employer-based training is used varies significantly by industry (Table 4). Industries which use formal training the most are those with high concentrations of personnel who can benefit the most from such training—managers, professionals, technicians, and sales personnel. Regulation and certification requirements typical of industries such as mining and health care also encourage formal training.

Small Versus Large Employers

Small employers (fewer than 500 employees) account for roughly half of all jobs in the American economy and 40 percent of new jobs being created.[30] Small employers are important trainers because they create so many new jobs, and because they tend to draw their employees from populations and industries that need employer-based training most. As Table 5 shows, employees in small businesses tend to be younger and less well educated than employees in larger businesses. Small businesses also tend to hire more Hispanic employees (but fewer Black employees) than larger employers. In addition, low-productivity service jobs tend to be concentrated in small businesses (Table 6).

Small employers tend to operate in relatively small markets and, therefore, tend to have jobs characterized by broad assignments of responsibility. Technologies also tend to be less specialized than in larger businesses. The lack of specialization makes both the employees and the employers flexible and provides a general-

ized learning experience that aids in career transitions. At the same time, however, small employers do not have enough employees to afford the lost time from work required for training during working hours. As a result, employees in small businesses tend to get less formal training than employees in larger businesses (Table 7).

As demonstrated in Table 8, persons who work for small employers tend to get their training off the job. Other data from the U.S. Small Business Administration show that in firms with fewer than 100 employees, three quarters of employees who receive training are trained off the job, compared with 58 percent of employees in larger firms.[31]

The relative importance of employer-based training increases dramatically with the size of the firm. Large employers tend to pay for more of the training taken by their employees outside the workplace. Other data indicate that employers with fewer than 100 workers pay for 23 percent of the training taken outside the workplace. Employers with more than 100 workers pay for 32 percent of the training taken outside the workplace.

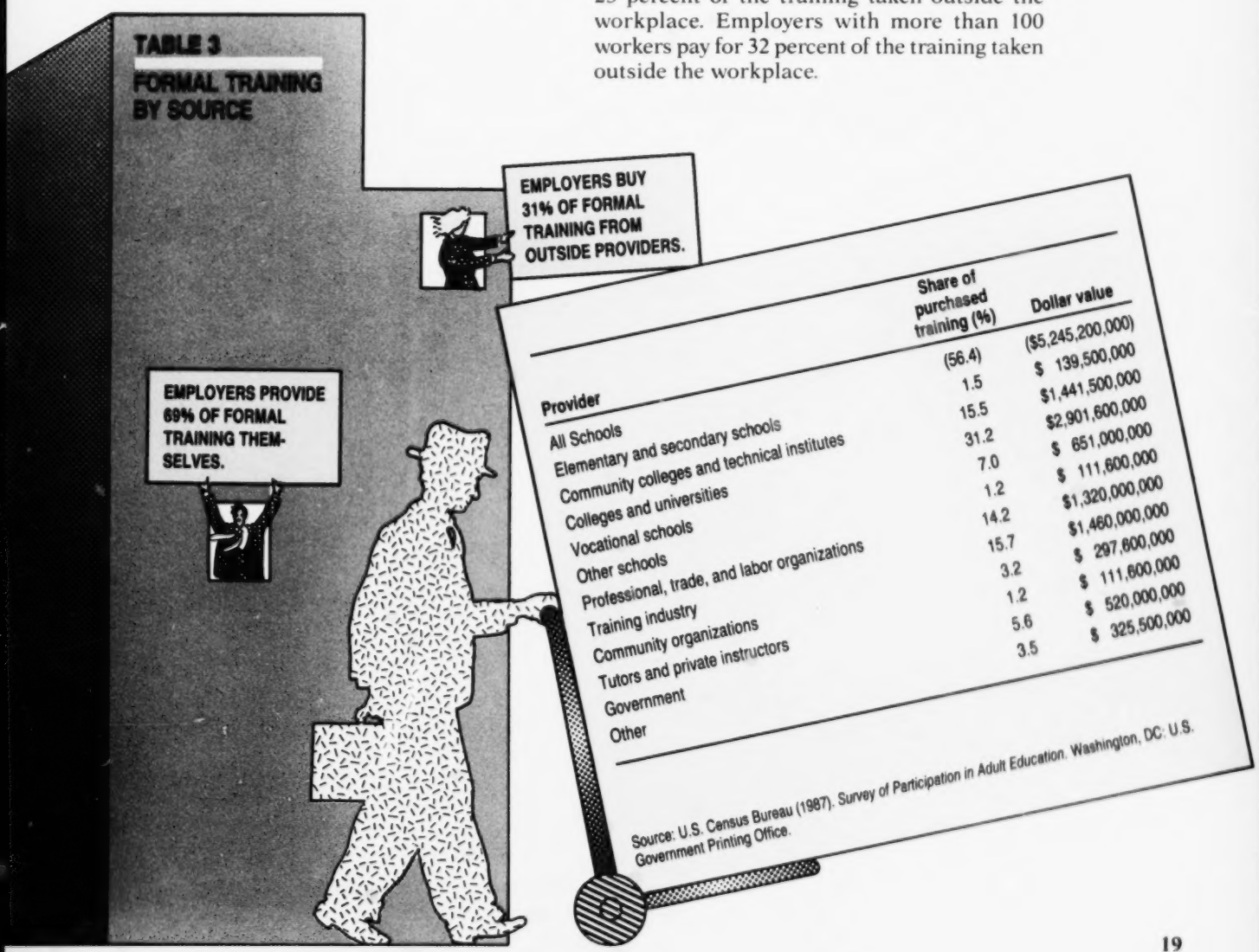


TABLE 3
FORMAL TRAINING BY SOURCE
EMPLOYERS BUY 31% OF FORMAL TRAINING FROM OUTSIDE PROVIDERS.
EMPLOYERS PROVIDE 69% OF FORMAL TRAINING THEMSELVES.

Provider	Share of purchased training (%)	Dollar value
All Schools	(56.4)	($5,245,200,000)
Elementary and secondary schools	1.5	$ 139,500,000
Community colleges and technical institutes	15.5	$1,441,500,000
Colleges and universities	31.2	$2,901,600,000
Vocational schools	7.0	$ 651,000,000
Other schools	1.2	$ 111,600,000
Professional, trade, and labor organizations	14.2	$1,320,000,000
Training industry	15.7	$1,460,000,000
Community organizations	3.2	$ 297,600,000
Tutors and private instructors	1.2	$ 111,600,000
Government	5.6	$ 520,000,000
Other	3.5	$ 325,500,000

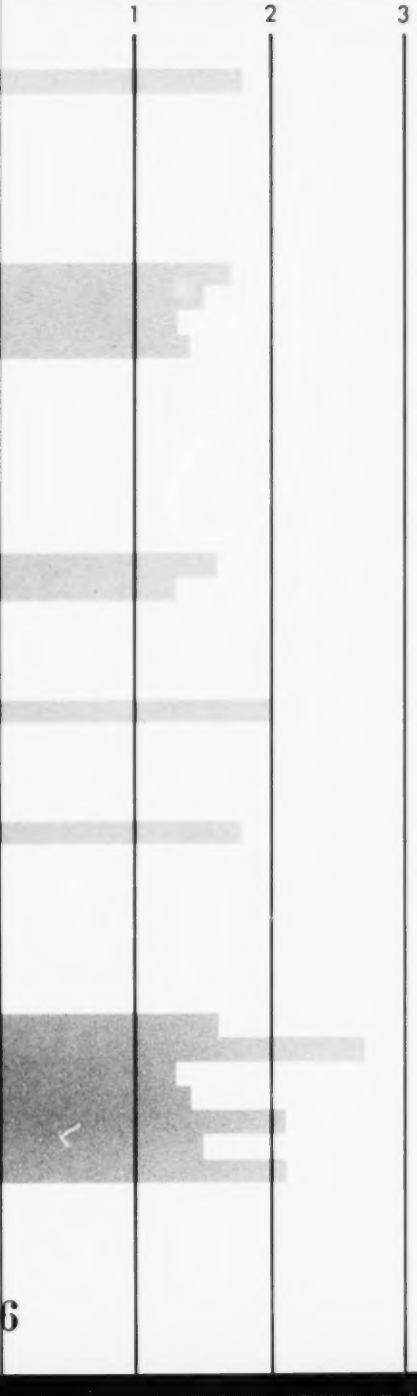
Source: U.S. Census Bureau (1987). Survey of Participation in Adult Education. Washington, DC: U.S. Government Printing Office.

TABLE 4

FORMAL EMPLOYER-BASED TRAINING BY INDUSTRY, 1984

Industry	Share of total training (%)	Training intensity (courses/employee)
Agriculture	0.7	0.2
Mining	1.6	1.8
Construction	2.2	0.4
Manufacturing	18.7	0.9
Lumber	0.3	0.4
Furniture	0.2	0.3
Stone, clay, glass products	0.4	0.6
Primary metals	0.5	0.6
Fabricated metal products	0.9	0.7
Machinery, except electrical	4.2	1.7
Electrical machinery	3.2	1.5
Motor vehicles	1.4	1.3
Aircraft	0.8	1.4
Other transportation	0.9	0.4
Instruments, toys	1.0	0.9
Food	0.9	0.6
Tobacco	0.1	1.0
Textiles	0.2	0.2
Apparel	0.1	0.04
Paper	0.3	0.6
Printing	0.7	0.4
Chemicals	1.7	1.6
Petroleum	0.2	1.3
Rubber, plastics, leather	0.7	0.7
Transportation, communications, utilities	7.8	1.1
Transportation	2.4	0.7
Communications	2.6	1.8
Utilities	2.8	2.0
Trade	8.5	0.4
Wholesale	2.9	0.7
Retail	5.6	0.3
Finance, insurance, real estate	9.4	1.5
Banking, finance	5.2	1.8
Insurance, real estate	4.2	1.2
Private household services	0.1	0.1
Services (miscellaneous)	41.3	1.4
Business	2.7	0.7
Repair	0.7	0.5
Personal	1.1	0.4
Entertainment, recreational	0.4	0.4
Medical, except hospital	5.7	1.8
Hospital	10.9	2.7
Welfare, religious	2.8	1.3
Educational	10.8	1.4
Other professional	8.0	2.1
Forestry, fishery	0.2	1.5
Public administration	9.7	2.1

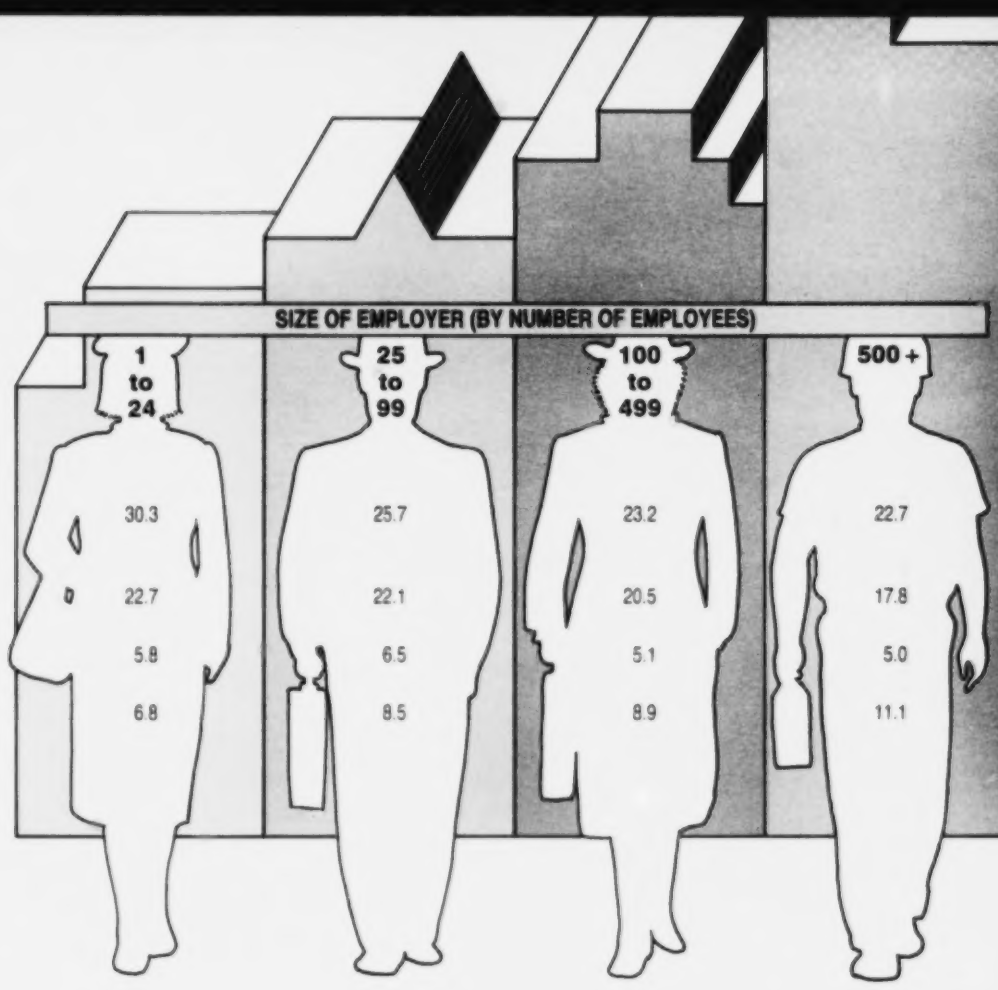
TOP 16
INDUSTRIES IN TRAINING INTENSITY
(COURSES/EMPLOYEE)



Source: Calculated from U.S. Census Bureau (1987). *Survey of Participation in Adult Education*. Washington, DC: U.S. Government Printing Office.

TABLE 5

DEMOGRAPHIC CHARACTERISTICS OF EMPLOYEES BY SIZE OF EMPLOYER (% OF EMPLOYEES)

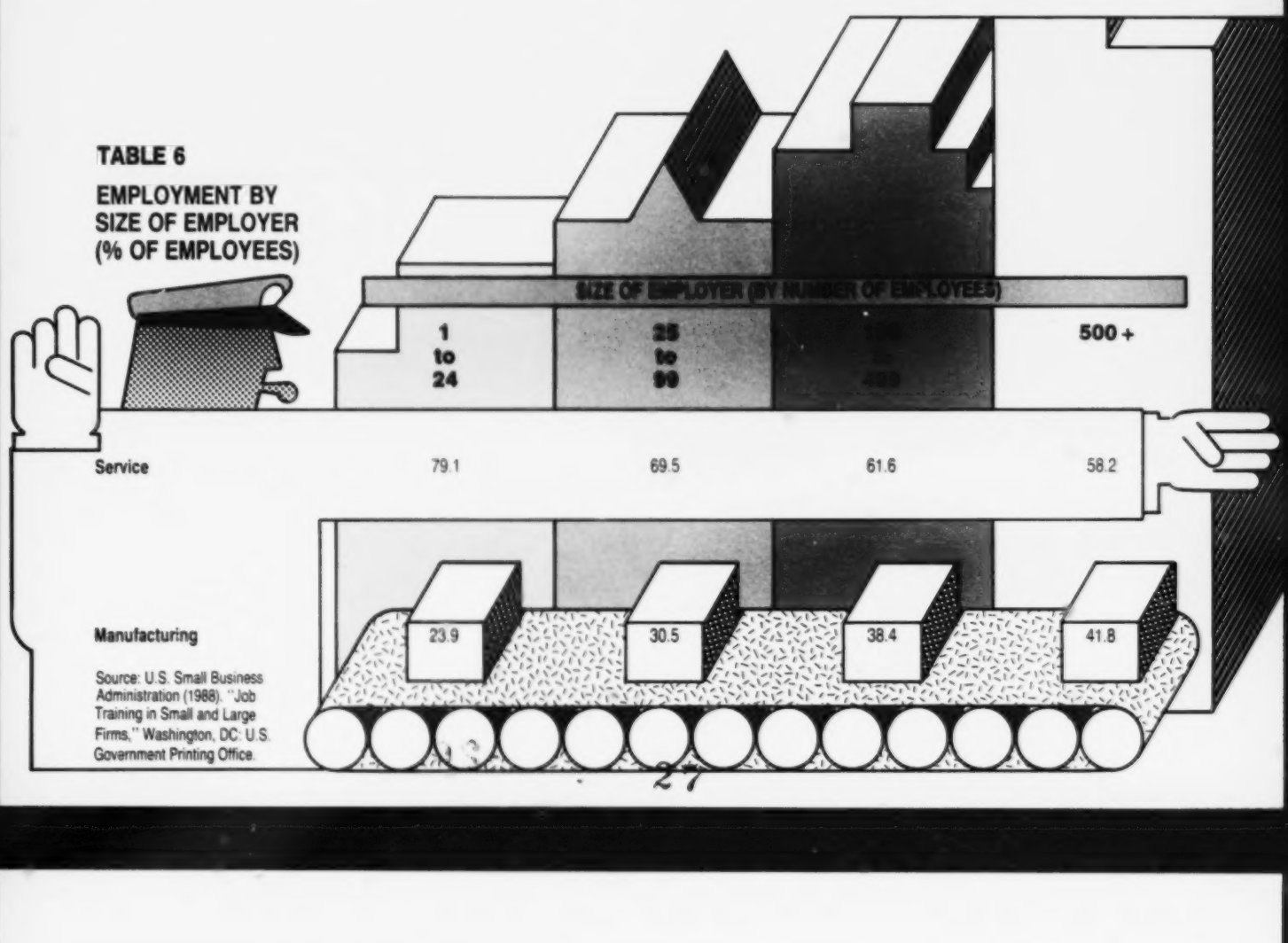


	1 to 24	25 to 99	100 to 499	500 +
Age 16–24	30.3	25.7	23.2	22.7
Less than 12 years of education	22.7	22.1	20.5	17.8
Hispanic	5.8	6.5	5.1	5.0
Black	6.8	8.5	8.9	11.1

Source: U.S. Small Business Administration (1988). "Job Training in Small and Large Firms," Washington, DC: U.S. Government Printing Office.

TABLE 6

EMPLOYMENT BY SIZE OF EMPLOYER (% OF EMPLOYEES)



	1 to 24			500 +
Service	79.1	69.5	61.6	58.2
Manufacturing	23.9	30.5	38.4	41.8

Source: U.S. Small Business Administration (1988). "Job Training in Small and Large Firms," Washington, DC: U.S. Government Printing Office.

Sales Personnel

There are almost 13 million marketing and sales employees in the United States. Most are concentrated in retail sales. More than 2 million of the nation's sales workers are cashiers, another 4 million are retail sales workers, and another million are stock clerks. The remainder sell commodities, business services, real estate, securities, and insurance.[59] Sales workers rely less on education than on employers for the training necessary to qualify for their jobs and to upgrade their skills once they are working (Table 14). The extent of training varies substantially among sales representatives. Those who sell insurance, real estate, securities, business services, and commodities have substantially more job-related education and employer-based training than those who sell retail products and personal services.

The success of current business strategies and the development of innovations frequently hinge on the skills of the sales force. "Customer service" strategies are impossible unless the sales force is well trained in this arena. Innovation strategies depend heavily on the ability of sales employees to recognize customers' needs for new applications of existing products. Sales personnel also need to be carefully integrated into the culture and structure of the company if they are to communicate new applications and other innovations up the line. Sales personnel are in a unique position to feed such information back to product development departments, along with information on what the competition is offering. If the sales operation is in tune with the rest of the organization, it can be the company's "investigative" division.

Sales managers tend to agree that employers can develop successful salespersons with careful selection and training. According to a recent survey, the typical sales training manager thinks that the superstar's success stems 48 percent from attitude, 25 percent from selling skills, 13 percent from product knowledge, 11 percent from experience (the previous sales record), and 4 percent from work effort and good assignments.[60] Attitude, selling skills, and product knowledge can be learned through training on the job. Careful selection is also important. The skills and knowledge that a salesperson brings to the job should generally fit the industry, company, product, or group of customers. For example, a salesperson who sells technical products or services requires a technical background; a person selling financial services requires a financial background.

Sales training focuses on new product orientation, product updates, attitudes and interpersonal sales skills, negotiation, and procedures (paperwork). Common courses include general selling skills, presentation skills, business writing, telephone skills, customer service, account management, planning, time management, goal setting, problem solving, stress management, and technical training specific to a product or industry.[61]

Data from two recent surveys indicate that product knowledge and selling skills are two of the most common focuses of corporate sales training.[62] But at least one study has shown that investment in selling skills can have a huge payoff; improving sales technique alone provided returns as much as 1,660 percent.[63]

Sales training accounts for roughly 16 percent of the training budget in Fortune 500 companies.[64] Virtually all companies train new hires, and more than half of large companies have formal policy statements outlining the number of sales training hours required, the courses to be taken, and the deadlines for completion. A company usually provides at least 48 to 80 hours of initial sales training, with some companies requiring 160 hours or more. Established salespersons receive about 43 hours of training per year.[65] About 16 percent of employer-based professional development for salespeople is through formal training; about 75 percent is through coaching by the sales manager.[66]

TABLE 7

AVERAGE NUMBER OF HOURS SPENT IN TRAINING ACTIVITIES IN THE FIRST THREE MONTHS ON THE JOB, BY SIZE OF EMPLOYER (% OF HOURS)

	SIZE OF EMPLOYER BY NUMBER OF EMPLOYEES				
	1–49	50–99	100–499	500–2M	2M+
Formal training programs	11.8	8.8	10.3	29.2	22.1
Watching other workers do the job	45.0	50.3	45.1	55.4	69.5
Informal training by management	76.0	67.0	76.2	75.7	70.1
Informal training by co-workers	44.7	45.8	51.4	74.6	45.0

Source: Bishop, J. (1982). *On the Job Training in Small Business*, Washington, DC: Small Business Administration.

TABLE 8

SOURCES OF JOB-SPECIFIC TRAINING BY SIZE OF EMPLOYER (% OF EMPLOYEES)

	SIZE OF EMPLOYER BY NUMBER OF EMPLOYEES			
	1–24	25–99	100–499	500+
Apprenticeship program	5.8	8.3	3.8	4.7
Business, commercial, or vocational school; junior or community college	32.9	25.6	28.3	23.2
Program at a college or university	4.3	4.0	5.7	3.6
High school vocational program	9.4	6.3	6.5	5.0
Military	4.8	5.9	4.2	4.3
Previous or current employer	27.0	36.8	38.1	48.5
Other	15.7	13.1	13.4	10.7

Source: U.S. Small Business Administration, (1988). "Job Training in Small and Large Firms." Washington, DC: U.S Government Printing Office.

PART III

The Trainees: An Occupational Perspective

The first thing that comes to mind when one looks at the scope of job-related education and training in the United States is that there is not enough of it. As shown in Table 9, only 55 percent of Americans have preparation for their jobs, and only 35 percent receive any upgrading once they are on the job.

The table also shows that human capital in the United States is unevenly distributed. Professionals are the most highly trained group, followed by technicians, management support specialists (e.g., accounting managers and personnel managers), general managers, mechanics and repairers, precision production workers, and craft workers. In these occupational categories, 61 percent to 94 percent of employees get training to qualify for their jobs, and 26 percent to 63 percent are upgraded once they are on the job. Among clerical workers, sales employees, and extractive workers (e.g., miners and oil workers), roughly half of employees get qualifying training and a third receive upgrading. The least educated and trained employees are machine operators, service workers, transportation workers, and laborers. In these categories, 18 percent to 37 percent of employees have qualifying training and 14 percent to 25 percent receive upgrading.

Table 9 reveals other general characteristics of job-related training in the United States:

- Preparation to qualify for a job is more common than upgrading once on the job.
- Qualifying training more often involves formal education and informal learning on the job than formal learning on the job. For upgrading, however, the three sources of training are usually of more equal importance.
- Employer-based training—formal and informal combined—is a more important source of qualifying training and upgrading than is schooling. Moreover, employers pay for a substantial share of job-related education. Among Americans who used education to qualify for their jobs, about 8 percent had their courses paid for by employers, and employers paid for the courses of 41 percent of those who used education for upgrading.

Managerial Personnel

Executives

There are roughly 2.5 million executives and senior managers in the United States. They represent the top decision makers in a work force approaching 120 million people.[32] Executives ride atop the managerial ladder, making policy decisions, shouldering overall profit-loss responsibility, and setting organizational objectives. The major difference between their current jobs as executives and their previous jobs as managers is that now they are required to make more decisions in general and more risky decisions in particular. And the decisions they make while executives are more likely to have far-reaching consequences.

Executives must also have more contacts with groups outside the corporation, including government agencies, other corporations, other countries, and the general public. When the executives and other leaders set a new corporate direction, the executives must lead, as well as manage.

By the time employees reach the executive ranks, they have already benefited from extensive human capital development. They have been trained for specific jobs, as they moved through the managerial ranks. They have also received substantial developmental training

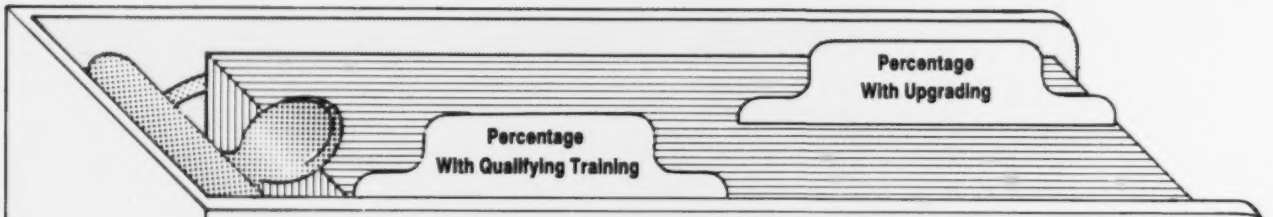


TABLE 9

SOURCES OF QUALIFYING AND UPGRADING TRAINING: ALL EMPLOYEES

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All employees	55	29	10	26	35	12	11	14
Nontechnical professionals	92	87	6	16	47	47	10	11
Management support specialists	77	52	11	38	52	20	20	17
General managers	71	43	12	39	47	18	17	16
Clerical	57	33	7	31	32	10	10	15
Sales	43	15	12	28	32	7	13	15
Service	36	13	9	18	25	7	8	12
Transportation	36	2	8	26	18	2	6	9
Machine operators	37	6	6	26	22	3	4	16
Laborers	18	2	2	13	14	2	2	10
Technical professionals	94	83	14	23	63	25	23	17
Technicians	85	58	14	32	52	20	18	19
Craft	66	11	16	44	26	7	7	13
Precision production	61	17	15	38	36	8	13	18
Mechanics & repairers	68	19	18	39	44	7	22	17
Extractive	56	4	13	48	34	6	13	18

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

that prepared them for "succession" to higher management, for example, traditional schooling and training, as well as job rotation and mentoring.

Once they break into the rank of upper management, executives continue to receive training—an average of 36.3 hours of formal training per year.[33] Participation on corporate task forces, on-the-job coaching, and mentoring provide executives with significant informal training in leadership roles as well.

About 70 percent of large U.S. companies have some ongoing effort for educating executives, even though executive education involves only about 0.75 percent of the total employee population.[34] Large, successful manufacturing firms have the most extensive and institutionalized executive development programs, and the banking and transportation industries seem to invest the least in executive training. A 1987 survey indicated that executive training absorbs 12 percent of the total training budget in Fortune 500 companies.[35]

Executive training and development tends to be centrally managed and delivered by training professionals. Most employers, especially in manufacturing, routinely charge back all costs of executive education to the operational departments, but in 40 percent of companies, the overall corporation pays. In 81 percent of large corporations, executive education is administered centrally, usually one or two levels below the chief executive officer. The executive education staff typically consists of one or two people who collect and broker program information (usually about specialized university and consultant programs) and counsel the executives to be trained.[36]

At least two thirds of companies that have executive education describe it as "individual development"—the building of leaders. Typical executive development programs focus on leadership, communication and motivation, and strategic planning.

Historically, the most common delivery method for executive training has been the seminar, usually provided by a university. Executive training has been unique in its reliance on sources outside the organization. Roughly half of all executive training involves special programs developed by universities, professional associations, and highly specialized consultant groups, either commercial or nonprofit. Anecdotal evidence, however, suggests a more recent trend toward executive development programs provided internally or bought outside but tailored to the individual employer's needs. The trend toward bringing executive development inside the employer institution reflects a felt need to provide a context that is specific to each employer's institutional culture and strategic niche, as well as conducive to the development of the working team.

In general, the success of executive training is subjectively measured, in part because executive performance is rarely subject to formalized performance review. Where formal evaluation is conducted, the most common practice is for the executive or the executive's superior to evaluate the transfer of training to daily activities. In-house trainers (or consultants, who provide the training in many situations) are not routinely involved in following up on training.

Managers

There are more than 5 million managers in the United States.[37] Managers are the fifth most highly trained occupational group in the American work force, after technical professionals, nontechnical professionals, technicians, and management support personnel (Table 9). The pattern of training for managers is typical of most Americans. As shown in Table 10, most management training is provided in order to qualify managers for their jobs. Formal education and informal training are the dominant sources of qualifying training, but for upgrading, managers rely on formal employer programs as much as on education and informal training.

Managers in financial jobs get more qualifying training from their employers than do other managers. Public managers and managers in medicine and health care get the most retraining from their employers. In general, public and private managers are about as likely to receive formal and informal qualifying training, but more public managers than private managers

get formal and informal upgrading.

Most working adults spend half their non-sleeping lives being directed by managers.[38] Unlike an executive, a manager executes policy rather than sets it. A manager frequently directs supervisors, generally has concrete data to work with when undertaking a task, and (among management staff) often has the most frequent interaction with others in the organization. The manager is the "translator" who conveys policy and motivates the work force toward achieving corporate goals.

Senior managers in major corporations generally have a large number of people reporting to them through other managers; they have considerable influence with executives on policy decisions. Middle managers are responsible for fewer employees, direct workers with supervisory responsibilities, and influence policy through senior managers.

Manager training, particularly for middle managers, is common among American employers. Although new managers usually begin with a good educational base—college degrees are the rule rather than the exception—they often have little training in motivating and managing people. As managers move from their areas of technical expertise, taking on the responsibilities of coordinating resources and people, they need a wider array of skills. The traditional response of American employers, therefore, has been to "make" managers through extensive training, including on-the-job training and mentoring.

In large employer institutions, senior managers are responsible for the training and development of the managers who work for them. Therefore, the delivery system for training most managers is highly decentralized. Management development programs are often developed and controlled centrally, however. The professional training staff supports senior management by providing advice and creating and delivering programs for training and developing managers. Judgement of the superior(s) is the most common vehicle for determining training needs of individual senior managers or selecting more general development programs.

New managers are most often trained in employee selection, decision making, team building, strategic planning, and budgeting. Experienced managers receive developmental training in subject areas that will make them more effective in groups, institutions, and the external community. Developmental training includes subject matters such as interpersonal skills, negotiation, teamwork, organizational development, and leadership. Most large companies promote understanding of social and political issues through training seminars and conferences.

Middle managers are a prime target of formal corporate training activity. Training for middle managers has been the most uniformly applied training effort of American companies over the past decade. Approximately three quarters (73.8 percent) of all private companies provide some formal training for their middle managers.[39] In 1987, such training represented 22.4 percent of the Fortune 500 human resource development (HRD) budget—the largest share devoted to any occupational grouping.[40] On average, each company that trains middle managers provides about 37 hours of training a year to each of 17 middle managers.

About half of American companies train senior managers. Each such company provides an average of 10 senior managers 34 hours of training a year.[41] Employers also support both job-related and non-job-related courses for managers through tuition assistance programs.

As a manager's responsibility and salary increase, mentoring, job rotation, and outside seminars tend to replace formal in-house training. Training delivery for time-conscious managers is often through small groups and sometimes deliberately held off-site to avoid telephones and other distractions.

The in-house training staff is the most frequent provider in 65 percent of Fortune 500 companies, supplemented by outside consultants, coaching, and mentoring.[42] At the beginning and middle manager level, more companies rely exclusively on in-house sources than at the senior level. In contrast, at the senior level, more companies use outside vendors and consultants alone than at lower levels.

Smaller companies rely more on outside suppliers and informal methods than larger companies. Large companies have enough re-

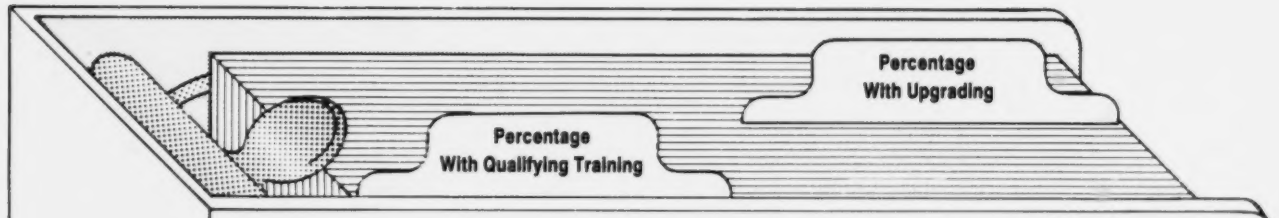


TABLE 10

SOURCES OF QUALIFYING AND UPGRADING TRAINING: MANAGERS

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All managers	71	43	12	39	47	18	17	16
Public	70	47	14	35	65	23	32	27
Private								
Financial	83	54	17	46	57	22	21	19
Personnel	76	41	7	39	55	15	23	17
Sales	74	44	21	46	52	16	24	21
Health	78	61	18	30	64	24	32	6

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training." Washington, DC: U.S. Government Printing Office.

sources to develop customized programs and enough managers to make the costs of developing and maintaining an in-house training department worthwhile.

Training for managers is evaluated more often than training for executives, but evaluation is still largely subjective. Large companies most often evaluate developmental programs using trainees' opinions (31 percent) and supervisors' opinions (29 percent). In the Fortune 500 alone, 54 percent of companies frequently use the superior's opinion to evaluate whether the training changed job performance, and 46 percent ask trainees.[43]

Quantitative evaluations are rare. If there is a return on investment (ROI) evaluation, it is usually done at the conclusion of the program or course. Six-month follow-up evaluations are infrequent among the Fortune 500 companies.

Supervisors

The supervisory work force includes close to 5 million American employees. More than half of these are in retail sales occupations. Roughly 2 million more supervise blue-collar employees in American industry. Another 700,000 are supervisors in office settings. The remainder are scattered throughout the nation's industries.[44]

As shown in Table 11, supervisory training follows a pattern similar to management training, but at reduced levels. In general, supervisors are slightly less likely to get employer-based training than managers. They tend to have substantially less formal education for job preparation or upgrading. With the exception of police and fire and office supervisors, in all other categories of supervisors, less than 20 percent of supervisors use job-related education to prepare for their jobs, and only 10 percent use formal education for upgrading.

In contrast to a manager, a first-line supervisor directs workers who make goods or perform services and who, as a general rule, do not supervise others. A supervisor implements new corporate directions at the point of production or service delivery and trains other workers, whether as an overt part of the job or through subtle behavioral cues that signal the supervisor's preferred methods of operation.

Almost no one moves directly into a supervisory position. Even if the new employee is academically well prepared for a management role, there is typically a period of two to three years on the job before the supervisory assignment. If a supervisor is new to the company, usually he or she has been a supervisor somewhere else. Often, skilled technical workers become supervisors, and strong technical skill is essential to maintaining the respect of production workers. However, new supervisors soon find that technical expertise is not enough and that a range of interpersonal and managerial skills is required to be a successful supervisor.

The content of the training for first-line supervisors reflects the employer's culture—including the extent to which employees are to be involved in decision making and the methods used to maintain a productive, informed, and satisfied work force. Most companies emphasize traditional management skills in training first-line supervisors. Employer-sponsored courses cover topics ranging from communications and leadership to company policies and how to conduct performance evaluations.

Technological changes have dramatically affected the first-line supervisor's job. Computerized information systems now allow top management to dip directly into the ranks for information. At the same time, new technologies and a greater reliance on working teams at the point of production and service delivery have made the working team more autonomous. The supervisor has had to assume a less aggressive role in managing work processes and a more supportive role in facilitating the work of front-line teams. In some industries, the demise of middle management's role as information organizer and gatekeeper has propelled first-line supervisors to assume new linkage and information-gathering roles. In some cases, hierarchical levels have collapsed; middle and first-line management have combined into teams that work on all aspects of operations with nonsupervisory personnel. This new participative management requires the first-line supervisor to spend more time dealing with conceptual and human resource issues than previously.

TABLE 11

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SUPERVISORS

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
Mechanics & repair personnel	68	15	22	43	58	5	38	22
Police & fire	58	24	26	34	78	39	35	33
Extractive	56	7	14	55	34	12	20	21
Office	59	25	13	37	50	16	24	16
Craft	70	17	13	55	25	8	6	11
Production	56	16	12	39	44	12	18	19
Sales	50	18	11	34	34	7	13	14
Food preparation	53	13	11	33	31	9	5	19
Cleaning services	41	7	7	30	25	4	12	10
Agricultural	32	9	7	27	34	3	8	28

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 12

SOURCES OF QUALIFYING AND UPGRADING TRAINING: MANAGEMENT SUPPORT SPECIALISTS

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All management support specialists	77	52	11	38	52	20	20	17
Financial	79	49	16	43	58	23	28	21
Human resources	74	38	11	43	60	18	26	23

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

In 1987, about 59 percent of all the large private companies offered some formal training for first-line supervisors, and those that did provided an average of 33 hours per supervisor.[45] Fortune 500 companies allocated about 22 percent of their HRD budgets to supervisor training in 1987.[46]

In-house training departments are the major agents of supervisor training. For example, 81 percent of Fortune 500 companies responding to a survey indicated that the in-house department is "always or frequently" used for supervisor training, and this training is the "primary charge" of the HRD department in 11 percent of these companies. Exclusive use of the in-house source is more common for supervisors (25 percent of companies with formal training) than for other levels of management personnel (17 percent and 10 percent for middle and senior management, respectively). Most companies (64 percent) use both inside and outside providers. Only 11 percent use vendors alone.[47]

On-the-job coaching is almost universally available, and in companies that do not provide formal training for first-line supervisors, coaching may be the sole source of training. Overall, coaching is generally considered to be the most common delivery method, with the immediate superior as provider.

The supervisor's superior usually evaluates whether the skills targeted in training actually transfer to the workplace. Self-evaluation occurs in 40 percent of Fortune 500 companies, a slightly smaller percentage than for the middle and executive management levels. Evaluation by in-house trainers is almost as common as self-evaluation.

Management Support Specialists

Apart from technical professionals, nontechnical professionals, and technicians, management support specialists are the most highly trained employees in American employer institutions. There are more than 3 million employees who provide management support in staff functions such as accounting, underwriting, personnel, labor relations, and training.[48] The training pattern for these workers tends to parallel the training pattern for managers (Table 12). Qualifying training for support professionals tends to emphasize schooling and informal OJT. In general, there is less upgrading than initial training, even though there is more formal employer-based training for upgrading than for job preparation.

Nontechnical Professionals

There are close to 9 million nontechnical professionals in the United States, including roughly 5 million teachers, librarians, and counselors and more than 3.5 million other professional specialists, such as lawyers, artists, designers, writers, and photographers.[49] Individuals in these occupations get more qualifying training than any other occupational group except technical professionals. They are unique in terms of the large amount of qualifying training and upgrading they receive from schools. In fact, no occupational group relies more on schooling for preparing for their jobs and upgrading after they are on the job than teachers. Lawyers and teachers are the most highly educated and trained nontechnical professionals. Photographers and artists get substantially less

education and training (Table 13).

Nontechnical professionals are generally defined as degreed workers who have attained specialized expertise in a given area other than the physical or natural sciences or mathematics and who have their careers focused in that area. They are usually workers who are salaried but exempt from receiving overtime pay when their workweek extends beyond 40 hours, according to the U.S. Fair Labor Standards Act.

Nontechnical professionals can be found throughout modern companies, working as members of the management staff and in specialized support divisions—as patent and tax attorneys; writers and editors; personnel, labor relations, and training specialists; and librarians who perform information searches and maintain specialized corporate libraries.

Nontechnical professionals generally have a great deal of autonomy in their jobs and are expected to work with a minimum of direct supervision. They make decisions related to their own areas of expertise and create their own methods for achieving major goals, often in concert with technical professionals. They are also expected to be motivated and able to set and meet objectives that contribute to achieving the larger corporate goal.

Professionals often have considerable latitude in working hours—and frequently choose longer hours than required, perhaps because of a strong work ethic, intellectual interest, or belief in the significance of a particular project to their profession.

Significant projects, special benefits, training, contact with respected peers, access to expensive facilities, and individual freedom are incentives for a nontechnical professional to continue in a job. Excessive management requirements, lack of recognition, and limited opportunities for learning are among the most frequent causes for departure. Thus, quality of worklife and potential for growth, as well as increased income are important criteria in employment decisions. Therefore, many corporations encourage professional growth through participation in professional societies, university teaching, or consulting. Corporations also create learning opportunities and other options—including high-salaried but nonmanagerial jobs—to retain professionals.

The main reasons that corporations invest in training for professionals are:

- to maintain expertise (update professional knowledge);
- to meet needs arising from new projects;
- to orient professionals to corporate goals and culture;
- to provide an incentive for hiring and retention; and
- to help employees manage stress and improve their health.

There is little information available on the training courses provided specifically for professionals, probably because much of this training is technical (and is measured in that arena) or comes from the general corporate training curriculum available to all managerial, technical, sales, and professional employees (time management, stress management, writing, etc.). However, professionals and corporate training executives interviewed for this study cited the following topics as frequent focuses of training:

- specialty skills (professionals frequently choose updating in their fields when training is elective);
- computer literacy;
- time management and project scheduling;
- report writing and English (writing is a primary function of most professionals);
- speaking and presentation skills;
- interpersonal skills, such as negotiation techniques;
- health and stress management;
- orientation to the company's goals and strategies;
- opportunities for career and professional development; and
- topics related to social concerns, such as the company's equal employment opportunity policy and employee safety programs.

According to the 1987 Lakewood survey, 48 percent of large corporations have training for their professionals, who receive an annual average of 36 hours of training per person. Of companies providing professional training, 64 percent use a combination of in-house and outside sources, 27 percent use outside vendors only, and 10 percent use in-house providers only.[50]

According to interviews conducted for this study, evaluation of professional training is most often subjective and ROI is rarely calculated.

Clerical Personnel

There are more than 20 million clerical personnel who provide administrative support in the United States. More than 5 million process financial records, and more than 4 million are secretaries. The remainder are clerks or dispatchers or have other information management functions.[51] As shown in Table 9, a little more than half of clerical personnel have qualifying training and less than a third get upgrading. These workers fall in the middle range of American employees in terms of the proportion who have qualifying training and upgrading.

There is mounting evidence that a growing share of clerical employees are undertrained. Information-based technology is increasing the importance of and skill requirements for clerical employees. The clerical worker of today usually operates a computer—over 82 percent of companies with more than 10,000 employees use computers for word processing.[52] The average clerical worker has learned computer operation or a new word processing program within the past five years and now uses a personal computer for preparing letters, keeping records, and scheduling office events. Clerical personnel may also be responsible for training new clerical workers or even the professional staff on new office equipment.

Some clerical employees, such as executive secretaries, have the responsibilities of power and confidentiality. Such workers usually need top-flight clerical skills, good social skills, supervisory skills to manage other administrative support personnel, good appearance, and the ability to stay calm under pressure.

Clerical time saves management time. In many instances, clerical employees have assumed tasks previously done by managers and other specialists. And with computer power, clerical workers can do more in less time. They have time for more editing, processing, drafting, and accounting-type functions, and can assume more administrative tasks, meaning that professionals and supervisors can delegate more of their duties to clerical personnel. This "skill migration" from managers, professionals, and other specialists is fueling debates on compensation and may push wage scales up.

Clerical positions are unique in their consistency from organization to organization; their core duties tend to be similar across all industries. These jobs are also unique in that they tend to have a limited career track that flows to executive assistant and stops. To move up significantly in salary, the clerical worker has to acquire a different job title and shift tracks to administrative or supervisory positions like office manager or purchasing director. Alternatively, he or she can change companies, leveraging skills into more pay.

Turnover is high in prosperous regions, where the supply of qualified clerical workers tends to be small and companies compete for good clerical personnel. In recent years, the opening of other career paths to women has affected the availability of good clerical personnel. Largely a female-dominated field (99 percent of clerical workers are women),[53] clerical work, with its limited career path, has suffered the loss of many people who would have seen it as a viable career option in the past.

In general, the investment in formal employer-provided training for clerical workers is low because they usually enter the work force with most of the basic skills (typing, shorthand, filing procedures) that enable them to do their job. High school vocational programs, community colleges, and trade and business schools usually provide this preparation. Increasingly, however, shortages in qualified clerical personnel are driving employers to create their own

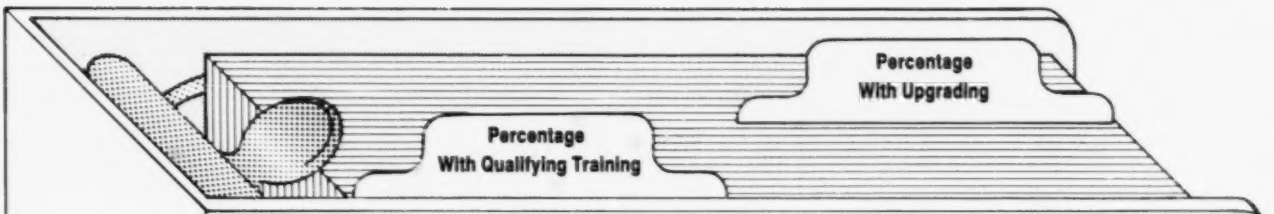


TABLE 13

SOURCES OF QUALIFYING AND UPGRADING TRAINING: NONTECHNICAL PROFESSIONALS

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All nontechnical professionals	92	87	6	16	47	47	10	11
Teacher	95	96	6	12	70	57	9	9
Librarian	78	68	2	26	53	30	9	9
Lawyer	95	92	3	17	55	15	9	10
Writer/editor	84	61	7	53	32	14	6	13
Photographer	81	41	13	42	48	19	6	20
Artist	83	67	5	33	32	20	1	7

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 14

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SALES PERSONNEL

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All sales personnel	43	15	12	28	32	7	13	15
Finance & business services	75	34	33	35	58	17	27	19
Commodities	55	24	12	38	40	9	21	17
Retail & personal services	27	5	5	20	20	3	5	13

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

clerical workers rather than buy them, and frequently, clerical workers with strong basic clerical skills need upskilling, particularly when computers are introduced into the office or a new word processor or information management software is brought on line. In fact, as employers have aggressively invested in word processing and other computerized office technology, they have increasingly found that clerical workers are the key to its efficient use. Thus, clerical training courses include orientation to the employer's chosen software for word processing, mailing lists, information management, and other functions. Other clerical training courses include telephone communications, spelling, time management, business writing, language and interpersonal skills, and career development.

According to interviews conducted for this study, employers rarely or never conduct needs assessments for clerical training. Faced with a training challenge whenever new machinery is introduced into the office, many companies elect to send their clerical workers to outside courses, often provided by the equipment vendors. However, training needs are often more extensive than those addressed in the vendors' overviews, and manuals designed to facilitate the integration of machinery are often complex. Consequently, more in-depth outside training, usually in the form of seminars, is needed. Frequently, however, even this opportunity is offered selectively—only one member of the clerical staff may go for training and, on returning, train fellow workers.

Fifty-three percent of all companies have formal secretarial-clerical training. The average company provided 26 clerical workers with 16.9 hours of formal training each in 1987.[54] Also in 1987, Fortune 500 companies spent roughly 6 percent of their training budgets on clerical training.[55]

Interviews conducted for this study reveal that only about 10 percent of clerical training is formal. The in-house seminar is the most common format for formal training, but 35 percent of all companies now use some computer-based training, mainly to teach computer-related skills such as word processing and spreadsheeting.[56]

Interviews also reveal that the usual practice is to use both in-house and outside providers for clerical training (44.5 percent of companies). Sole use of the in-house training staff is more common than sole use of outside vendors (36.5 percent vs. 18.9 percent, respectively). Training purchased from vendors is often noncustomized, but 50 percent of companies that have clerical training use customized vendor training for clerical personnel.[57] The prime responsibility for clerical training is usually at the corporate level, with major responsibility co-located at the plant, department, office, or store.

Evaluation of clerical training in technical skills is frequently experiential. The worker goes to training and then is expected to apply the skills on the job. Manpower, Inc. (a prime trainer of clerical personnel placed as temporary workers in offices) tests workers extensively, maintaining "the only true method of testing lies in assessing an operator's ability to apply skills and knowledge to a realistic work sample."[58] To test for office automation skills, Manpower requires the trainee to create a document from handwritten draft through proofreading and final printed copy.

Training in the "softer" side of clerical work (interpersonal skills, time management, etc.) is infrequently evaluated. When it is, evaluation is generally subjective, gauging the participant's reaction to the training.

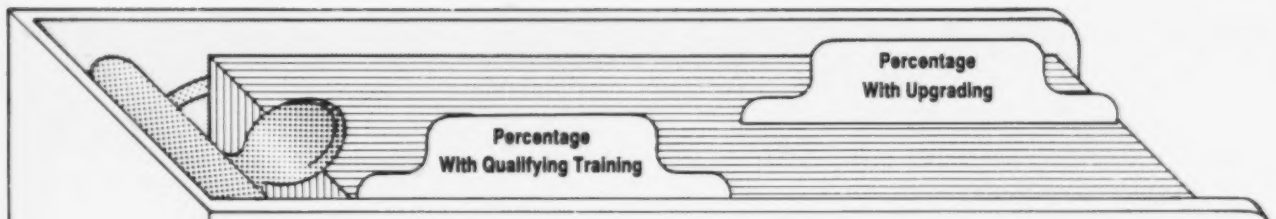


TABLE 15

SOURCES OF QUALIFYING AND UPGRADING TRAINING: SERVICE EMPLOYEES

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All service employees	36	13	9	18	25	7	8	12
Police & fire	56	18	29	24	55	20	28	21
Health	62	29	15	27	42	9	11	22
Building	14	3	2	10	24	9	12	20
Personal	52	34	12	12	29	9	8	6
Food	24	2	3	20	15	2	2	11

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

TABLE 16

PERCENTAGE OF WOMEN, BLACKS, AND HISPANICS IN TECHNICAL OCCUPATIONS, 1986

Occupational Group	Women	Blacks	Hispanics
All workers	44.4	9.9	6.6
Technical workers	24.3	6.4	4.8

Source: "Labor Force Projections: 1986–2000" (1986). *Monthly Labor Review*, Vol. 110, No. 9.

Training provided by in-house sources is the most productive type of training, according to sales training managers and vice presidents responding to a 1987 survey.[67] But such training does not necessarily involve the in-house training department. A wide variety of people and organizations, ranging from the in-house training department to sales managers to outside consultants, universities and colleges, provide sales training. In fact, in most Fortune 500 companies, sales training is usually provided by someone other than the in-house training department.

Sales training managers, vice presidents of sales, and, to a somewhat lesser extent, chief executive officers are responsible for tying the goals for professional development of the sales force to the corporate goals. Objective training goals (e.g., trainee increases number of calls made by 5 percent within the next six months) are used by 84 to 90 percent of companies. Training managers or sales managers usually assist designated trainers in setting training goals, with salespersons involved in only 28 percent of companies.[68]

Lectures are still the most common delivery method for sales training, and less than 50 percent of training programs for salespeople are "canned" (standardized), meaning that the same program is delivered regardless of company, industry, product, or kind of customer.[69] Canned programs tend to cover generic sales skills, whereas more tailored training programs focus on product knowledge and other company-specific subject matters.

Videotaped presentation is popular because of its flexibility. It enables training to be conducted immediately after hiring, introduces new products without bringing all salespersons to one location, and demonstrates products consistently to everyone. Custom video is expensive but cost-effective compared with using untrained salespersons in the field.

Videotaping the salesperson in action is also useful for showing how he or she comes across to customers; videotaped role play is increasingly becoming a standard tactic in sales training.[70] (Computer-based and interactive video training are not yet used extensively, probably because of high development costs.)

The most common means of evaluating sales training courses is to solicit the trainee's opinions; the "smile test.' Sales training is more carefully evaluated than management training, in part because the sales process is more easily quantified. Tests for learning retention are administered less than 35 percent of the time, and less than 25 percent of companies use cost-benefit analysis; about 50 percent of companies use customer evaluation as an indicator of a salesperson's performance and thus an indirect indicator of training's effectiveness.[71]

Customer Service Personnel

As the nation's service sector grows, so grows the importance of high-quality customer service. Many kinds of workers share the challenge of providing high-quality customer service, but none are more directly involved than the direct customer service workers. They are the link between the company, the product, and the consumer. Advertising may make promises, but customer service workers must deliver.

Although business willingly acknowledges the important role of the customer service worker, compensation has not kept pace with praise. Many workers are in low-pay categories, have minimal (if any) benefits, or work only part time. Entry-level positions and minimum wages are common.

The "baby bust" of the 1960s and 1970s may affect customer service jobs more than other jobs. It was the demographic forces of the 1970s that spawned so many service enterprises whose profitability depended on minimizing

wages, training costs, and capital investments. This trend could be reversed in the 1980s and 1990s. The worker shortage has already become a major problem in the fast-food industry.[72] Of the 3.5 million people who work in this industry, 70 percent are age 20 or less. Usually, this job is their first job, and it serves as a transition between home and school.[73] In retail, the employees are mainly part-timers and the problem is turnover. According to Alice McCord of the National Retailers Association, "The industry faces a young, poor-quality applicant".[74]

Customer service training, therefore, will become increasingly important. One survey noted it as second in importance only to management training in projections for 1988 and beyond.[75] Interviews conducted for this study reveal that customer service training usually involves courses in interpersonal skills and customer relations. Because so many customer service workers are first-time employees, they need basic orientation to workplace customs. Also, much of their training comes under the general rubric of sales training. Customer service training courses cover topics such as product and service orientation, problem solving, negotiation, selling, customer-interaction skills, stress management, basic clerical skills, and computer keyboarding.

Despite its growing importance, there are few available data on customer service training per se. The 39.6 percent of employers that train their customer service personnel provide about 26.8 hours of training annually per person trained. Overall, 5.86 million customer service workers were trained in 1987, for a total of 157 million hours of training.[76]

Only 13.3 percent of companies that provide formal training rely on outside sources alone; 42.7 percent use a combination of in-house staff and outside providers and 44 percent provide formal training using in-house staff only.[77] Prime responsibility for training customer service workers rests at the divisional, group, or subsidiary level.

Companies conduct very little evaluation of customer service training. However, in many cases, supervisors observe the interactions of employees with customers and make subjective evaluations of the training's effectiveness. In some cases, such as telephone sales, phone calls to customers may be monitored and used by supervisors as an evaluation tool.

Service Employees

There are 18 million service employees in the United States—7 million in food preparation, 3 million in building services, and roughly 2 million each in health, personal, household, and police and fire services.[78] Overall, service employees are among the least educated and trained American workers, because of the low rates of education and training among food service workers and cleaning personnel. Health service employees, police and fire employees, and people in personal service occupations, such as barbers and child care workers, get much more training (Table 15).

Technical Workers

Technical workers use theoretical principles from the mathematical or natural sciences in their work. They also tend to utilize substantial amounts of technical machinery or processes in their work and work in industries that produce technical machinery or other products derived from the application of mathematical or scientific theory. Technical workers are especially important to American competitiveness because they tend to work in industries that produce the lion's share of internationally traded products and services. Technical workers are also important because they invent and produce the technologies that result in the upskilling of all workers. Ultimately, the continuous integration of new technologies with more highly skilled labor is the engine of American competitiveness.

Attempts at defining technical training and the technical work force are always somewhat arbitrary. The definition used here—that technical employees use theoretical principles from mathematics or the natural sciences in their work—is no exception. In general, this definition includes technical professionals (e.g., scientists, doctors, and engineers); technicians and technologists, concentrated in both manufacturing and health care; craft workers, concentrated in the construction trades; and skilled workers concentrated in manufacturing. By this definition there were 20.3 million technical workers in the United States in 1986, amounting to 18.2 percent of the American work force.[79]

Table 9 shows that of all occupational groups, technical professionals, who number almost 4.8 million (24 percent of the technical work force), get the most education and training in preparing for their jobs and the most upgrading. The nation's 3.5 million technicians, who make up 18 percent of the technical work force, get more education and training in preparation for their jobs and more upgrading once they are on the job than any occupational group except technical and nontechnical professionals. There are almost 11.8 million blue-collar technical workers (58 percent of the technical work force), including precision production workers, mechanics and repairers, extractive workers, and craft workers.[80] Blue-collar technical workers get only slightly more preemployment education and training and upgrading than the average American worker. Moreover, they rely much more on informal learning on the job than other technical workers.

The nation's almost 7 million machine operators and assembly workers are not included in the figures just given even though their jobs are increasingly technical in content. As discussed earlier, automated manufacturing is increasing the depth and range of skills required in these jobs; many are being consolidated and upgraded into technical jobs. Although they are difficult to count, it is clear that many operators and assembly workers have already become technical workers, including as many as 2 million who work in high-tech industries.

As shown in Table 9, operators and assemblers get relatively little preparation for work or training once they are on the job.

Although the workers in some technical occupations, especially in health care, are predominantly women, men dominate the technical work force, totaling 76 percent of all technical workers. As shown in Table 16, women, Blacks, and Hispanics are generally underrepresented in the technical work force.

Technical workers are distributed unevenly throughout the economy. About 1.5 million are self-employed, principally as doctors, engineers, carpenters, mechanics, and repair workers. The largest number of technical workers is found in the service sector, mostly in health care. Manufacturing employs about 14 percent of all technical workers.

The construction industry has the highest concentration of technical workers; one third of all workers in the construction industry are technical employees. Mining, transportation,

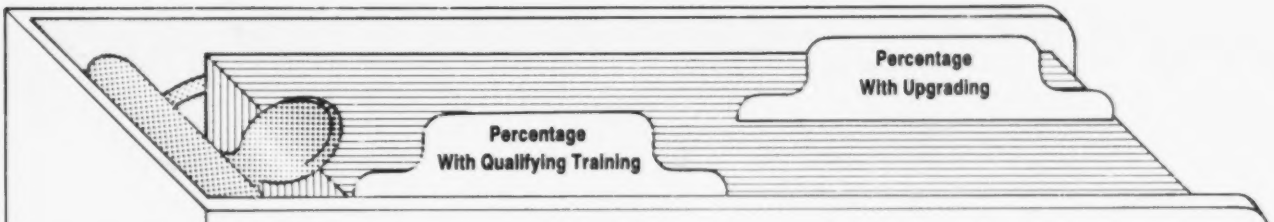


TABLE 17

MEDIAN WEEKLY EARNINGS BY SEX, 1986 (DOLLARS)

Occupational Group	Both sexes	Men	Women	Ratio
All workers	358	419	290	.69
Technical workers	482	501	420	.84

Source: "Labor Force Projections: 1986–2000" (1986). *Monthly Labor Review*, Vol. 110, No.9.

TABLE 18

SOURCES OF QUALIFYING AND UPGRADING TRAINING: TECHNICAL PROFESSIONALS

			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
All technical professionals	94	83	14	23	63	25	23	17
Architect	94	91	13	31	41	10	7	23
Engineer	90	73	14	33	57	23	28	18
Health	96	96	10	7	72	33	8	8
Mathematical & computer scientist	90	66	26	41	65	21	36	24
Natural scientist	97	91	9	26	59	30	25	15

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training." Washington, DC: U.S. Government Printing Office.

and utilities have the next highest concentration, with nearly one fifth of their employees in technical occupations. In manufacturing, services, and government, about one worker in six is a technical worker.

Technical workers earn well above the average for all workers (Table 17). Male technical workers earn more than their female colleagues, but the disparity is less in technical occupations than in the economy as a whole. In technical occupations, female workers earn 84 percent of what male workers earn; in the economy as a whole, female workers earn 69 percent of what male workers earn.

Technical Professionals

Technical professionals are educated and trained to make broad judgments, to invent, and to apply a particular intellectual discipline to problem solving. In health care, technical professionals include employees responsible for making diagnoses and prescribing treatment to be provided by others. In other industries, technical professionals are responsible for developing new products and designs, enhancing existing products, and conducting research, but not necessarily responsible for formal management or exercising direct authority over subordinates. Technical professionals are most critical in the overall design and development phase of the competitive cycle and the diagnostic phase in the provision of health care services.

Technical professionals include the nation's 2.5 million health professionals, 1.5 million engineers, and 800,000 natural, mathematical, biological, and computer scientists.

Technical professionals' jobs most frequently require at least a four-year college degree and often require formal schooling beyond the undergraduate level. As shown in Table 9, technical professionals are the most highly educated and trained of the nation's employees. Relative to other employees, they tend to receive substantial amounts of both education and employer-provided training—formal and informal—both to qualify for their jobs and to upgrade skills once they are on the job.

All technical professionals rely heavily on schools to prepare them for their jobs. However, relative to other technical professionals, engineers and mathematical and computer scientists rely less on schools and more on employers for qualifying training (Table 18). This suggests that engineering, mathematical, and computer jobs are more tailored to a particular employer and the employer's product, resulting in less carryover of academic training into the workplace.

Health professionals get the most upgrading of all technical professionals and rely on schools more than their employers for both qualifying and upgrading training, suggesting that skill needs are not employer specific and that health care professionals have a stronger bond with their profession than with specific employers.

Technical professionals usually receive training in subject matter that applies broadly to a specific area of expertise. Because of the breadth of potential application, organizations have, in the past, played a relatively passive role in training their technical professionals, most often providing only general guidance and funding. However, in recent years, the pressures of competitiveness have encouraged companies to integrate the development and design of innovations with production and marketing. The attempt to build more integrated R&D structures has encouraged more institutional control over the training and development of technical professionals.

Technical professionals, however, are still relatively autonomous in their professional development. Although most of their training is intended to update skills or knowledge in the face of new technology, the exact application of these skills and knowledge is usually left to the individual. For example, a seminar might introduce a new synthetic material and explain its development, properties, and uses. The design engineer who will use the material in new products will use the information much differently than the engineer who will test the products, once developed.

The technical professional's ability to glean diverse applications from generic material makes seminars and symposia, such as those

offered by colleges and universities, professional organizations, and other public providers, a good alternative to in-house training curricula. In 1987, companies in all sectors spent approximately $117 million to send their technical professionals to seminars. Colleges and universities are the most frequent source of outside seminars, drawing $41.1 million per year in revenues to train technical professionals from private industry.

Vendors are another major source of training for technical professionals. Vendors supplied approximately $175 million worth of off-the-shelf training materials, custom materials, and other training support services to technical professionals in 1987. Other sources of training (both in-house and outside) for technical professionals account for an additional $1.4 billion per year.

A growing number of manufacturing companies are presenting training in integrated manufacturing to their technical professionals. Integrated manufacturing covers all phases of manufacturing from concept development, through design and development, to producing the finished project. The root principle of the integrated manufacturing perspective is to bring elite technical professionals together with production workers, sales and marketing personnel, and other members of the institutional team. The ultimate purpose is to reduce the cycle time required to integrate new technologies and to get innovations to market, to improve efficiencies and quality, and to encourage new applications. In addition, with such training, technical professionals can be responsible for more than one job or process, rather than a single function or process, as had previously been the case. This technique parallels the technique of cross-training, which is becoming increasingly common among technicians and craft workers and resulting in a more knowledgeable and more versatile work force that is more responsive to organizational, technological, or industrial shifts.

Technicians

There are approximately 3.5 million technicians in the United States—more than 1.5 million health technicians, almost 1.3 million technicians in engineering and the sciences, and another 800,000 broadcast, computer, and air traffic technicians. Next to professionals, technicians are the most highly educated and well trained employees in the American work force (Table 9).

A technician is an employee whose primary expertise lies in a particular specialty area. Although technicians have considerable depth of knowledge and highly developed skills in their specific areas of expertise, they lack the breadth of knowledge in the theoretical aspects of their specialties that is required of technical professionals. And although many technicians are graduates of four-year colleges, many have developed their skills and knowledge at technical or vocational schools or community colleges, or, on occasion, through on-the-job training.

Many workers in the health care field, including nurses, physical therapists, x-ray technicians, and other operators of diagnostic equipment, are good examples of service sector technicians. Technicians from manufacturing include circuit board assemblers and quality control technicians who oversee laser equipment in automobile assembly plants.

Technicians usually receive training that applies directly to their jobs. The training has its basis in theory, but is focused more directly on the application of theory to the job than is training for technical professionals.

Because technician training has a mixed focus of theory and application, a mix of instructional methods is necessary to ensure adequate skill acquisition and transfer. Most technician training includes three phases of instruction:

1. Introduction of the theories or principles behind the technology;
2. Demonstration of the application of the theories, principles, and processes in a job environment; and

3. Hands-on practice of the skills and knowledge application in a simulated work setting.

Like training for technical professionals, technician training includes generic courses. Unlike much training for technical professionals, however, most technician training is sequential and job specific and includes principles of new technologies (primarily equipment and processing techniques) and new applications for existing technologies. Technicians also take special courses required for licensing or certification, or "refresher" courses required for license renewal or recertification. Virtually all technician training is directed toward upgrading or updating skills.

Because of the hands-on nature of the technician's work, courses in safety and hazards are required. Technicians also receive specific training in procedures required for successful job operation, especially if the procedures are mandated by a government agency. For example, technicians in a drug company receive training in clean room operation and maintenance; laboratory technicians in a hospital receive training in maintaining sterile equipment and recording patients' test results properly; and technicians in a nuclear power facility receive training in emergency shutdown and evacuation procedures.

Of the more than $3.28 billion spent by employers each year for outside training and training support services, approximately $103.2 million is for technician training.

Because of the nature of technician training, programs sponsored by colleges (including two-year colleges), universities and professional associations are a frequent source of training outside the organization itself. Of the $68.9 million provided technicians each year to attend outside seminars and conferences, university-sponsored programs account for $24.1 million. Vendors, especially "original equipment manufacturers" (OEM), also supply a considerable amount of technician training and related support materials.[81]

The amount of time technicians spend in training varies widely according to the job held, the company's support for training, and state and local certification (or licensing) requirements. There are few data available concerning the length of training specifically for technicians.

Blue-Collar Technical Employees

The nation's blue-collar workers number almost 30 million craft workers and operations personnel: construction workers, repair persons, precision production workers, extractive workers, machine operators, assembly workers, transportation workers, and laborers.[82] According to the definition used here, only the precision production, craft, extractive workers, mechanics, repairers, some of the machine operators, and some assembly workers are technical workers. The remainder of the blue-collar work force is the labor pool from which new technical workers evolve.

With the exception of extractive workers and machine operators, roughly two thirds of blue-collar technical workers get some kind of formal or informal preparation for their jobs, substantially less than the proportion of workers who get qualifying training in the white-collar and technical elite populations (Table 9). Blue-collar technical workers tend to rely on informal training on the job more than other occupations for the qualifying training and upgrading they do get.

Equipment manufacturers are a vital source of training when the training goal is skill update. The rationale behind OEM training is that the manufacturer has a better understanding of equipment, processes, and procedures than any other source and is, therefore, most qualified to conduct training. Many companies that use OEM training purchase it as a part of the acquisition cost of new equipment. Unfortunately, no funding figures are currently available for OEM training.

When recertification or relicensing is the training goal, corporate training strategy often specifies two tracks: high-tech and low-tech. Craft and operations workers in high-tech jobs are likely to attend training sponsored by local colleges, vocational-technical schools, and professional groups. (This is especially true for jobs requiring a specific number of hours of

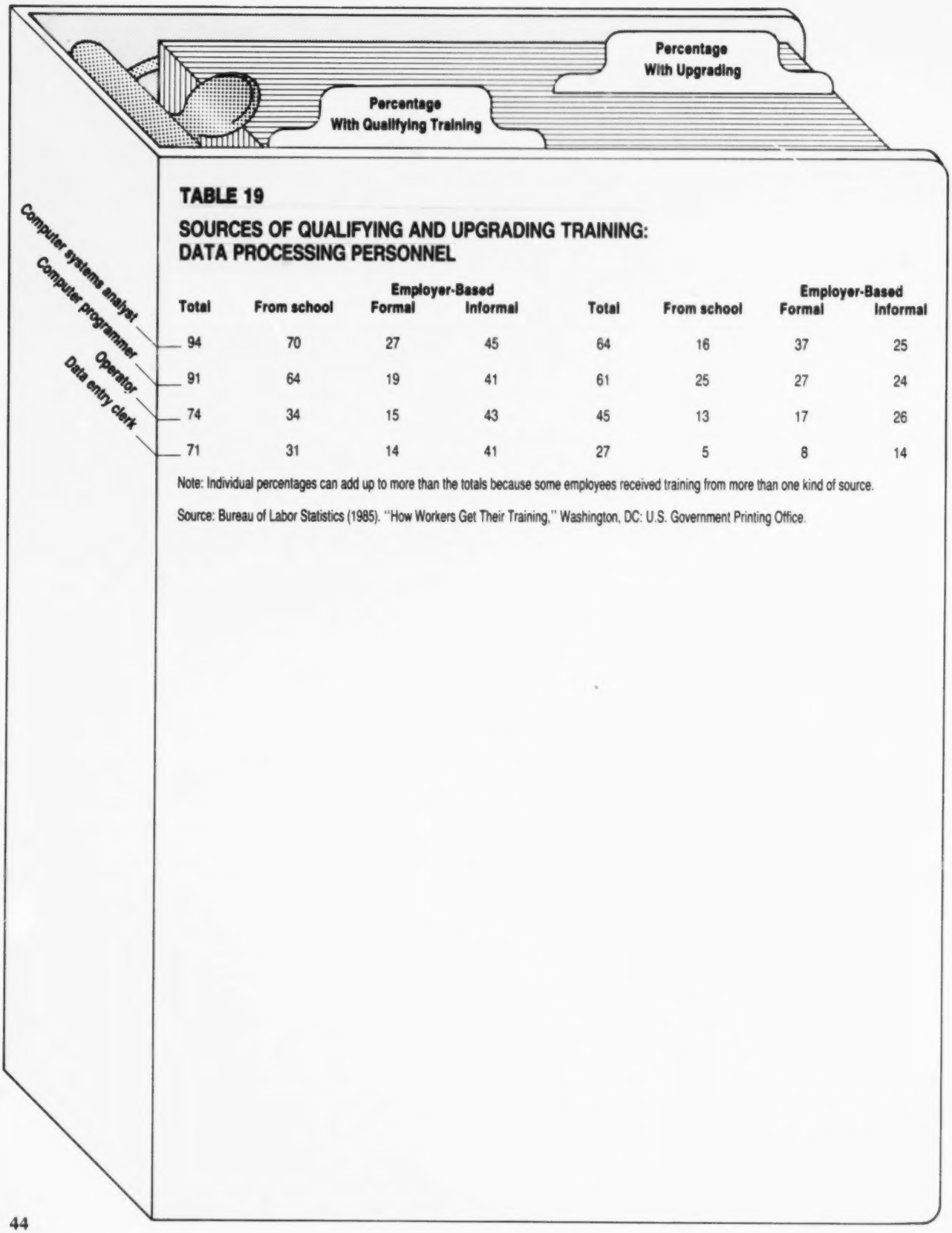


TABLE 19

SOURCES OF QUALIFYING AND UPGRADING TRAINING: DATA PROCESSING PERSONNEL

	Percentage With Qualifying Training				Percentage With Upgrading			
			Employer-Based				Employer-Based	
	Total	From school	Formal	Informal	Total	From school	Formal	Informal
Computer systems analyst	94	70	27	45	64	16	37	25
Computer programmer	91	64	19	41	61	25	27	24
Operator	74	34	15	43	45	13	17	26
Data entry clerk	71	31	14	41	27	5	8	14

Note: Individual percentages can add up to more than the totals because some employees received training from more than one kind of source.

Source: Bureau of Labor Statistics (1985). "How Workers Get Their Training," Washington, DC: U.S. Government Printing Office.

training or continuing education units for recertification or certification at a higher level of proficiency.) Employees in low-tech operations jobs are more likely to receive their recertification training through in-house programs, which are provided locally to minimize time lost from the job and to allow for tailoring to fit local needs.

A number of different sources can provide cross-training and retraining, depending on the specific kind of training needed. Training by the equipment manufacturer is appropriate if operation, maintenance, or repair of new or complex equipment is involved. Local colleges or vocational-technical schools are good providers when training must cover basic principles and will involve laboratories, or when the company would incur a great expense for equipment that would be used only in training. Much cross-training also takes place, formally or informally, on the job.

Data Processing Personnel

The growing importance of data processing has created a distinctive population for training. Although individual categories of workers might seem to more rightly belong in other occupational categories, the industry which they serve (data processing) makes it more appropriate to treat them as a separate cohesive occupational group.

There are more than 1.5 million data processing personnel in the United States, including information managers. This encompasses more than 300,000 computer systems analysts (computer scientists are also in this category), almost 500,000 programmers, more than 300,000 operators, and roughly 400,000 data entry clerks; the rest are information managers.[83] Systems analysts (including computer scientists) are technical professionals and information managers are in the category of managers. Programmers fall somewhere between professionals and technicians, depending on their responsibilities. Operators and data entry clerks use the computer as a job aid and neither create nor manipulate technology. Since they do not use theory in their work, they cannot be considered technical workers according to the definition used in this discussion and would probably normally fall into the category of clerical personnel.

Data processing personnel are among the most highly educated and trained occupational groups in the American work force. As Table 19 shows, both systems analysts and programmers receive about as much education and training to qualify for their jobs as any of the major occupational categories, and operators and data entry personnel get more qualifying training than all but a few of the occupational categories. The proportion of systems analysts and programmers who get upgrading compares with the figure for technical professionals, the most intensively upgraded group; computer operators get about as much upgrading training as general managers. Data entry personnel, however, get much less upgrading than qualifying training.

Systems analysts get substantial schooling, usually in colleges or universities, to prepare for their jobs, but rely on formal and informal employer-based training for upgrading. For the most part, programmers use a combination of schooling from colleges and junior colleges, employer-based formal training, and informal OJT both to qualify for their jobs and to upgrade their skills on the job. Operators use a similar mix of schooling and training on the job.

With the exception of data entry clerks, data processing personnel get more formal and informal employer-provided upgrading than any of the major occupational groupings.

Data processing personnel are a product of the information age. They build information

systems and programs. They operate computers, compile and structure data, and input data into computers. Their primary product—information—may be sold to external sources or may be used internally as the raw material of institutional efficiency.

The structure of data processing operations in an employer institution is similar to the structure of most technical functions. The systems analysts and computer scientists perform research, development, and design functions outside the line structure of the institution. Information managers are in charge of daily operations and the work of programmers and operators. In many cases, a substantial number of operators and data entry clerks are in departments outside of computer departments, creating a highly decentralized network of customers for the data processing operation.

With the downsizing of computer hardware through the miniaturization of circuitry and the spread of user-friendly technology, data processing operations are ever more dispersed. As a result, data processing personnel are serving multiple roles in R&D centers and line departments, and as service and training providers for the rest of the institution. In order to cope with dispersion, some employers have established a new staff department, the information center, which is an intermediary between database managers and end users. The center is charged with providing training, applications, and support to the computerized departments throughout a given company. Even with user-friendly programs, communicating with the computer means learning a foreign language. Information centers perform a coordination and training function, helping end users produce spreadsheets and graphs and integrating applications and hardware between departments.

Advances in information-based technology have been the major source of changing skill requirements in most American jobs. Data processing occupations continue to be hardest hit by the whirlwind of changing skill requirements that emanate from the ever new information technologies. This fact explains why data processing employees receive so much qualifying training and upgrading. It also explains why so much of their training is employer provided. The technology is simply moving too fast to wait for schools to catch up.

Ironically, computer programs sometimes replace their creators. Jobs that originate with new technology are eventually simplified. For example, general-solution business applications like VISICALC and LOTUS 1-2-3 are reducing the demand for computer programmers. Moreover, it is no longer necessary for programmers to understand hardware architecture or design separate data structures for each application—two skills that distinguish a program analyst from a programmer.

Interviews conducted for this study indicate that, with the exception of data entry clerks, data processing personnel generally have college degrees or have attended structured programs at technical schools and received certification. Frequently, courses include managing information systems, computer design and analysis, auditing (of both systems and procedures, including security measures), and programming in specific computer languages, such as BASIC, FORTRAN, and COBOL.

Armed with basic education or certification, the aspiring data processing worker usually enters the work force as a development specialist or a beginning programmer. Hands-on experience and OJT are then the keys to professional development.

Expertise in a particular kind of information system is gained through experience and is essential to career mobility. Data processing personnel often market themselves to employers on the basis of knowledge of a particular system and its programming requirements. From the employer's perspective, information managers who already know the essential elements of the employer's computer system can adjust rapidly to their new jobs. Hiring experienced people is simply the most cost-effective approach to hiring what is usually high-priced technical talent.

Information systems are highly tailored to the specific structures and products of employer institutions, encouraging formalized training for new data processing personnel to ensure speed, consistency, and quality of learning. The most common delivery method for for-

mal training is the seminar. Information managers spend an estimated 100 hours or more per year in formal computer-related training.

The rapidly changing technology of the computer field drives data processing personnel to keep their knowledge current by reading trade journals, attending conferences, interacting with vendors, and networking with colleagues through professional societies. User groups of data processing personnel who use the same technology are a regular tool for problem solving and training. Information managers who manage other computer professionals, as well as computer systems, reported in interviews conducted for this study that although a college degree may be essential for movement into management in this field, support and mentoring from supervisors are often the most important ingredients for success on the job. This accounts for the relatively high level of informal OJT among data processing personnel.

PART IV

Conclusions and Recommendations

The data discussed in this report, the full body of our research not discussed here, and our prior experience with employer-based training lead to three principal conclusions concerning job-related education and training in the United States:

1. It is critically important to individual opportunity and the competitiveness of the nation's employers.
2. There is not enough of it.
3. It is unevenly distributed among the American population.

Our research in this document and elsewhere has given us a rough sense of what might be done to improve the American job-related education and training system. We offer some preliminary recommendations here, a full year prior to final publication of our reports. We offer these recommendations, even though the nation's institutions are hard pressed for resources and cannot afford much of what we recommend because we believe resources should not govern our conclusions.

Employers

The principal challenge in improving the nation's job-related learning system is for American employers.

1. Employers currently spend about $30 billion, 1.4 percent of the national payroll, on formal training and development. Currently, 1 in 10 American employees gets some formal training from his or her employer. Many of the nation's large companies spend 2 percent of payroll on training and development, and employers with the most substantial commitments to training and development spend 4 percent.

   How much employer-based training is enough? We don't know. But our research suggests to us that these current commitments are probably insufficient. In previous studies, the American Society for Training and Development had recommended a commitment of up to 2 percent of payroll, but even the 2 percent target is not sufficient. The following are more appropriate goals:

   • an interim target of 2 percent of payroll nationwide—an increase from the current $30 billion to $44 billion. The $14 billion increase would be sufficient to increase coverage from the current 10 percent of employees to almost 15 percent of employees; and
   • an ultimate goal of 4 percent of payroll nationwide—an increase from the current $30 billion to $88 billion. This $58 billion increase would be sufficient to increase coverage from the current 10 percent of employees to almost 30 percent of employees.
2. In addition to increasing resource commitments, employers will need to integrate their human resource development structures into institutional culture and structure to:
   • accelerate and cushion the impact of change;
   • encourage learning that drives efficiencies, quality improvements, new applications, and innovations;
   • reduce the time it takes to get innovations to market;
   • encourage flexibility rather than resistance to change; and
   • provide products and services tailored to customers' needs, as well as good customer service.
3. Moreover, employers will need to push the

human resource development activity as close as possible to the point of production and service delivery, and to the interface between the institution and its suppliers and customers. Technical changes affect production and service delivery employees most. As a result, they have much to learn. They also have much to teach. Their hands-on experience with the product and customer contact make them prime experts and the front-line listening post for new efficiencies, quality improvements, new applications, and innovations. The people who use a product or service, the customers, know most about its strengths and weaknesses and should be listened to carefully.

4. Employers should work to improve the integration of human resource development into the institution by taking these steps:
   - the chief executive officer must make training a priority;
   - the training and development executive must be a full member of the senior management team;
   - line managers throughout the institution must be responsible for training and developing their subordinates; and
   - training must be available to all employees, not just white-collar and technical elites.
5. Accountability between schools and employers is a two-way street. The schools cannot deliver unless the nation's employers become full partners in American education by:
   - communicating new knowledge and changing skill requirements as they accumulate in the workplace;
   - embedding schooling in the career development process by giving more weight to educational attainment and achievement in hiring decisions; and
   - working with educators to develop and provide "learning and earning" curriculums that combine academic and applied learning experiences.
6. The state of the art in employer-based learning far exceeds the state of practice. Employers need to:
   - create an institutional environment that encourages the proactive use of human resource development as a tool to encourage efficiencies, quality improvements, new applications, and innovations;
   - use selection and appraisal procedures that assess job-related training needs;
   - use reward systems that provide compensation based on skill;
   - build training-related performance-based requirements into management and supervisory job descriptions and work objectives;
   - treat training as an investment with the same payoff as R&D; and
   - work together, sharing development and delivery costs of training materials, technologies, and basic research on applied learning among adults.

Educators

Employers depend on educators to provide job-ready and training-ready entry-level employees. Employers also turn to educators for most of the training they buy from outside sources.

1. Educators need to change some of their basic strategies. They need to:
   - work with employers to strengthen the link between learning in school and learning on the job;
   - hire better prepared teachers, pay them what they are worth, and measure learning outcomes;
   - link the teaching of academic subjects to real-world applications; and
   - teach future employees how to make decisions, how to solve problems, how to learn, how to think a job through from start to finish, and how to work with people to get the job done.
2. High school graduates who do not go on to postsecondary education will require spe-

cial attention. The United States is competitive in the educational preparation of white-collar and technical elites, but less good at providing basic education and occupational training to non-college-bound youth. The 43 percent of American high school students who are tracked into the watered down "general curriculum" and the 19 percent who are in vocational courses need a new curriculum that mixes solid academic basics and applied learning, preferably in work settings.

Government

Given current demographic and economic trends, the education and training needs of the traditional public clientele—the disadvantaged and dislocated—are urgent. Further, mainstream employees and employers are also now appropriate targets of public education and training policy. The United States must expand its original public policy goals in education and training beyond the established concern for social justice for the disadvantaged and dislocated to a broader concern for the employment security of the mass of American employees and for the competitiveness of the nation's employers.

1. The disadvantaged have the first claim on public attention and public resources. The nation is already past due on its commitment to provide equal opportunity for participation in the American culture, polity, and economy. The litmus test of this commitment to opportunity is willingness to commit public resources to make every American capable of getting and holding a job. A job is the price of admission to this individualistic culture and participatory political system. Persons unable to get work disappear from the community, drop out of the political system, and fall into the underground economy.

   Providing human capital development for the disadvantaged would do more than honor American commitments to equal opportunity. It would also pay off in dollars and cents. Investments that endow the disadvantaged with the necessary skills to make them economically independent will reduce the costs of public dependency. In addition, with the decline in the number of entry-level workers, the nation now needs all of its young people on the job to remain economically competitive.

   Preparing the disadvantaged for jobs with a future will require a mix of family support, basic education, and job training. Programs should be predicated on the principles that the best social welfare agency is a family, the best educator is experience, and the best trainer is a job. With these principles in mind, we recommend the following features for programs targeted to the disadvantaged:
   - responsibility for programs for the disadvantaged should reside with the state and local governments;
   - employers should be assigned a substantial role in the planning and oversight of these programs;
   - programs should emphasize human capital development through work and learning rather than income maintenance;
   - performance standards should be a key operational component; and
   - programs should emphasize the coordination of human services at the state and local levels.

2. Experienced employees who become unemployed after several years on the job also have an important claim on federal resources. The same destructive processes are at work for the dislocated as for the disadvantaged. The disadvantaged tend to start out and end up at the bottom of the economic heap. The dislocated experience an economic loss that rarely results in persistent poverty but probably involves an equal amount of suffering. Dislocated employees

are hurt not so much by where they land as by how far they fall.

Dislocation is here to stay. The harsh reality is that a fair trading system and new technology will inevitably benefit all Americans in the long term, but some will be hurt in the immediate future. In the end, practical necessity and compassion suggest the need for policies to address the immediate problems of job dislocation.

Policies for the dislocated need not be expensive. Fewer than 1 million experienced American employees are dislocated each year. The current proposal for expanding the $30 billion unemployment insurance system beyond its current emphasis on income maintenance is worthy of consideration. There are three important principles in crafting programs for the dislocated:

- the government should ratchet up the safety net for dislocated employees and should help them avoid a free fall from middle-class status to official poverty;
- prior notification of layoff is needed and counseling, job search assistance, and outplacement should be encouraged while employees are still on the job; and
- the government should provide dislocated employees counseling and job search assistance, and then give them training. Training outside the context of a job or job commitment is usually folly. Training does not create jobs. Jobs create the need for training.

3. A policy to improve access to training for adult Americans should include six components:
   - loans that individuals could cash in as they choose with employers or other education and training providers;
   - incentives for employers to provide more training, preferably investment incentives delivered through the tax code;
   - state and local experimentation with policies to encourage employer-based training;
   - publicly funded R&D and the dissemination of best practices in employer-based training;
   - a "third party" strategy that would use institutions outside government and industry, such as unions and professional, occupational, and trade associations, to develop standards, training, and internship/apprenticeship experiences in particular occupations; and
   - grants to employers and the full range of public and private training suppliers for "capacity building" for delivering more effective job-related training.
4. The vast majority of Americans who are neither disadvantaged nor dislocated are becoming new claimants for public resources. The pace of technical and economic change has increased entry-level skill requirements and the need for skill upgrading after employees are on the job. The pace of change has also reduced the commitment between employer and employee, forcing employees to take responsibility for their own employment security and career development. If employees are going to take responsibility for their own careers and the security of their families, they are going to need some new tools, such as access to retraining, portable pensions and portable health care coverage, day care, and parental leave. Government will have to help employees and employers pay for these new services.

America's 120 million job seekers and employees who are not disadvantaged or dislocated need job-specific training to get their jobs and upgrading to keep their jobs and get better ones. Most Americans learn what they need to know to get a job and keep it either in school or on the job. According to the Bureau of Labor Statistics, 54 million Americans, 55 percent of the work force, say they needed some kind of job-related learning to get their job.[84]

Growing concern with the nation's economic competitiveness has resulted in a new public interest in the quantity and quality of the nation's employer-based training because of its economic importance. Between 1929 and 1982, training on the job accounted for more than half the growth in the nation's productive capacity. The other principal contributors to improved economic performance were education and machine capital, which contributed 26 and 20 percent, respectively.

Policies to encourage more and better employer-based training are conspicuously absent in the nation's investment portfolio. In addition, the absence of learning infrastructure on the job is the missing link in the partnership between schools and employers. To the extent learning is embedded in the economy, the economic importance and the leverage of preemployment education and training will increase. To the extent learning becomes more connected to job performance and economic rewards, students and trainees will be more interested in their own development.

Moreover, to the extent employers rely more on training as a strategic tool, partnerships between employers and the education and training community outside the workplace will be strengthened. Employers will be more interested in well-prepared entry-level employees who are ready to be trained. Employers who upgrade their employees more would find more use for external educational and training institutions. Large employers already buy 30 percent of their upgrading, more than $10 billion worth, from outside suppliers. Smaller employers buy almost all their training outside. The ideal device for expanding employer-based training would be some form of investment incentive for new training.

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U.S. Department of Labor

Employment and Training Administration
200 Constitution Avenue, N.W.
Washington, D.C. 20210

AMERICAN SOCIETY FOR
TRAINING AND DEVELOPMENT

1630 Duke Street
Box 1443
Alexandria, VA 22313

703-683-8100